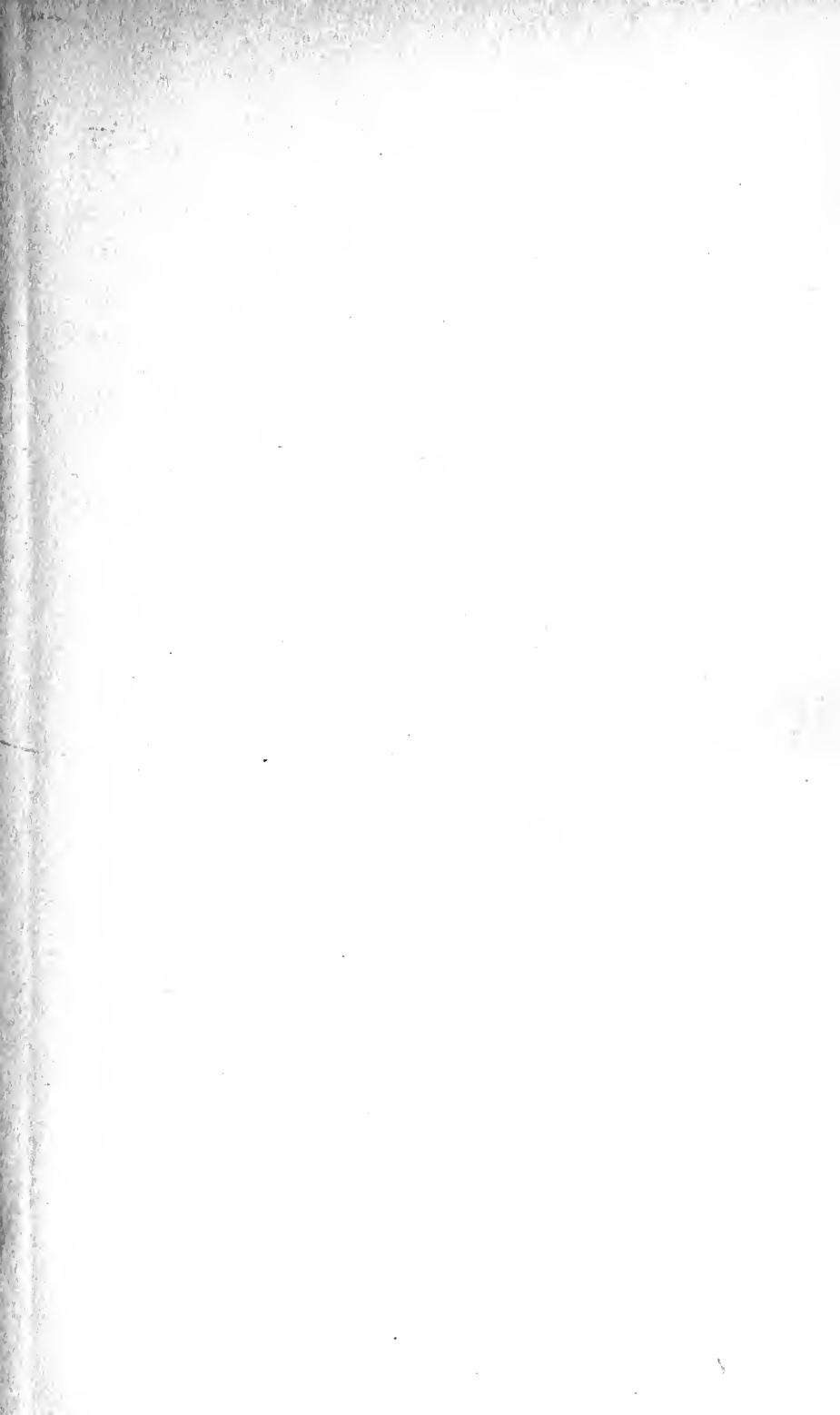


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Science
IV

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THE NEW PHILOSOPHY

Vol. XXIII

JANUARY, 1920

No. 1

NOTES BY THE EDITOR.

In our present issue we commence the translation of Codex 36 of the Swedenborg manuscripts preserved in the ROYAL ACADEMY OF SCIENCES at Stockholm. To this translation we have supplied the title "A Philosopher's Note-Book" as seeming to most fully cover the contents of the manuscript, which are exceedingly varied. For the most part they consist of hundreds of citations from ancient Greek and contemporaneous European philosophers on psychological and theological subjects, all arranged under general headings. The manuscript also includes a small work on algebra, besides notes on musical harmony, a work on Correspondences, and drafts of proposed contents of a series of physiological treatises. In the present translation, we have undertaken a work that will be unique in the literary annals of the New Church, namely, the translation of a miscellaneous manuscript, exactly as it occurs, and with practically no attempt at re-arrangement of the contents.

It has generally been supposed that in his quotations from Aristotle SWEDENBORG used the edition published by Du Val in 1739; but during our investigation of the quotations made in Codex 36, we discovered that this was not the only edition consulted by Swedenborg. In the ECONOMY OF THE ANIMAL KINGDOM he quotes from a little work on DE CAUSIS, which he refers to as by Aristotle; this work, however, is not included in Du Val's edition, and we have been able to consult it only in the Latin edition of the OPERA OMNIA, published in 12 vols., 1560,—though this was probably not the edition consulted by Swedenborg.

This little work, DE CAUSIS, was translated from the Hebrew and is now thought to date from the second or third century. It is from this work that Swedenborg drew several of the passages cited from Aristotle, which Dr. Wilkin-son, in his translation of the ECONOMY, was unable to verify. For the benefit of such of our readers as may be interested in this verification, we add the following table showing the references in DE CAUSIS to the unverified citations in volume II of the ECONOMY:

- E. A. K. 252 De Causis Proposition 22.
257 De Causis Proposition 2, 4, 9 and Prop. 24.
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Mundo VI.
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A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

[*Inside front cover.*]*

OBSERVANDA IN SCRIBENDIS.†

N.B. N.B. N.B.

1. A calculation may be made as to how great is the number of the human race for a period of 7,700 years; also as to how large is the space of our world,‡ that it may be filled with souls; and that still more planets are required in order that they may procreate such number. So likewise in all other worlds.

That a new earth is for the sake of innumerable inhabitants; and that the kingdom of God ought to be perfected; without such planet it cannot be perfected.

2. That the earth was nearer the sun, and that it will return nearer to the sun, in order that a new race may be born; and that the sun will burn up its surface. This, however, is a conjecture.

3. That an earth cannot be destroyed until the men have become utterly perverse; and that then all nature is disturbed by reason of this perversity.

"He that is called, being free, is Christ's servant. Ye are bought with a price; be not ye the servants of men." (I. Cor. vii, 22, 23.)§

*The writing here was entered probably after, and in connection with the writing on the inside back cover.

†Things to be observed in writing.

‡*Mundus* (world) means also a solar system.

§Written lengthwise in the margin, opposite nos. 1-3.

4. That the more the world is perfected in the sciences and in learning, the more it is estranged from God. God demands an ignorance of things that is full of faith and of His praise; so that we may know naught else than to praise God and to attribute all to Him; and not to enquire into the arcana of His nature, for the purpose of thereby acquiring an intellectual faith. But it has come to pass that such sentiments are believed absurd, and, therefore, if I may so express it, I also ought to prove all things intellectually, though I myself would choose rather bare faith and the bare celebration of God's glory,—like David and others in the New Testament. Wherefore God devoted Himself to fishermen and shepherds, since others could have no taste for anything of that kind.

Rom. II. 7. "To know life eternal is the part of those who persevere in well doing, seeking glory, honour and immortality."*

—That philosophy with all its departments—and also the physical sciences—seduces us, is clear. For it can extend only to things visible and intellectual, and cannot penetrate to things superior; which, indeed, it reposes as paradoxical, and thus believes to be nothing at all. For they must be expressed by such things; and all that we believe to be anything must be put aside.

[page 1.]

1. The old man answered Solon: Ye are all youths in mind; for ye have among you no ancient opinion derived from remote tradition, nor any system of discipline hoary in its beauty. (Plato, *Timæus*, p. 22 [B, vol. III; 2 Bohn 325†].)

*Written in French lengthwise in margin opposite no. 4.

†All the quotations from Plato made in the following pages were taken from Stephen's edition of Plato's works published in three volumes folio, Paris, 1578, which was the edition owned by Swedenborg; see FIBRE, n. 266a, p. 191. This edition contains the

Greek text with a parallel column of Latin translation by JOH. SER-RANI. The volumes and pages of Stephen's edition are noted in the margin of most, if not all, subsequent Greek editions of Plato's works; and also in Dr. Jowett's excellent translation of the *DIALOGUES*. The references can therefore be easily found by those who

The charge against Socrates: Socrates, being more curious than is right and proper, searches into things under the earth and in heaven; by his discourse he makes the worse appear the better cause; and he teaches the same also to others. (Plato, *Apologia Socrates* [iii] p. 19 [B, vol. I; 1 Bohn 5].) It behooves him that is studious of science and intelligence to search into the first causes of wise and prudent nature. (Plato, *Timaeus*, p. 46 [D, vol. III; 2 Bohn 352].) A greater or more useful gift than philosophy never was, nor ever will be conferred by the grace of the immortal gods on mortal man. (*Ibid.*, p. 47 [B, vol. III; 2 Bohn 352].)

Intelligence, and the ancient and august philosophy, after purging the mind of false and vain opinions, and recalling it from great ignorance, have dedicated it to knowledge, and lifted it to the contemplation of things divine. (Plato, *De Anima Mundi*,* [ii p. 104] [B, C, vol. III, 6 Bohn 167].)

Let Socrates alone! Restrain him not! for this is his usual way. . . . Disturb him not! Let him live in his own way. (Plato, *Convivium* [3], p. 175 [B, vol. III, 3 Bohn 479].) Aloof from human pursuits, and perpetually engaged in things divine, he is carped at by the multitude as of unsound mind; but the vulgar do not know that he is filled with the divine spirit. (Plato, *Phaedrus*, p. 249 [D, vol. III; 1 Bohn 325-6].)

Let none of the Greeks entertain any fear that it is dangerous for mortal men to concern themselves with things di-

have access to these works; but for the further convenience of the reader we have added the corresponding references to the very literal translation by GEORGE BURGESS, as published in Bohn's CLASSICAL LIBRARY (6 vols.) It may be noted that the Latin translation by Serrani is quite periphrastic, and sometimes rather an interpretation than a translation; but in view of the fact that, in all his writings, Swedenborg invariably uses this translation with-

out alteration, we have thought it wiser to adhere to it rather than give a literal rendition of the Greek. In addition to translating the Greek text, Serrani also prefixes to each of Plato's works a series of "Axiomata" or axioms, being a digest or summary of the teachings of the work in question. In a few cases the citations made by Swedenborg are taken from these axiomata.

*The full title is *Timaeus Locrus de anima mundi et naturae*.

vine; . . . rather, should he hold that, under the auspices of the Divine Deity, a mind is given to men that they may learn; and that all things learned are learned by their greater virtue and efficacy. What God teaches us men, this we understand; . . . for truly, if I may so express it, he, [God] would be ignorant of himself if he were angry with him, to whom he attributes the ability to understand, because he learns such matters; nay, and unless, without any envy, he rejoices with him, to whom, by his own help, good has come. (Plato, *Epinomis* [10], p. 988 [A-C, vol. II; 6 Bohn 28-9].)

Hath not God made foolish the wisdom of this world? (I. *Cor.* i, 20.) The Lord knoweth the thoughts of the wise that they are vain. (I. *Cor.* iii, 20.)*

If a speaker expresses his meaning readily; if he uses well rounded phrases; if his countenance reflect a certain liberality and magnanimity; if he is a person of quality; if he has a great retinue; if he imparts a certain weight and authority to his words; if others remain silent and listen with attention; if he is held in esteem, and carries himself like a man of the first rank; if, in fine, he be happy enough to procure for himself favor and esteem; then, whatever he says, will be most rightly said. How else? His dress alone would prove everything. (Malebranche, *De veritate*, [ib.], ch. xviii [p. 71,† 1 Eng. 107].)

Fine and discerning wits are they who, under the guidance of reason, distinguish the remote difference of things; who foresee effects depending on occult causes that are uncommon and unperceived. . . . But soft wits have none but a false subtilty; they are neither lively nor perspicacious; they do not see even those effects that proceed from sensible and most manifest causes; and lastly they have neither comprehension nor penetration. But in regard to sensible ways of acting and

*Quoted from Beza's translation, Amster., 1669. A copy of this edition was in Swedenborg's library.

†The page numbers added to quotations from Malebranche refer to the Latin edition published

in Geneva, 1691. This is a translation from the original French. We have also added references to the English translation, London, 2 vols., 1694-5, which we refer to as "Eng."

speaking, they are extremely nice. . . . If a man speaks freely and readily; if he uses terse and well chosen language; if he makes use of figures that please the senses, move the affections in some unperceptible way; then, in the opinion of the vulgar, he will most certainly be an elegant, subtle and refined wit,—even though his utterances contain nothing of truth, nothing of good, and nothing that is not useless. (Malebranche, *De Verit*, L. II, pt. ii, ch. ix [p. 140; 1 Eng. 210].)

The vulgar esteem what glitters, not what is solid, and this because they love what affects the senses rather than what informs the reason. (Malebranche, *De Verit*, L. II, pt. iii, ch. v [p. 171; 1 Eng. 263].)

[page 2.]

ARISTOTLE* TO ALEXANDER—ON THE WORLD.

Philosophy readily marks those things that have kinship with each other, and when, by the divine eye of the soul, she also has comprehended the nature of divine things, she straightway commences to interpret them, and to take the part of a teacher, as it were. . . . One writer will describe Ossa, another Nisa, others the Corycian cave, and others again whatever they deem to belong to the particulars of our orb. The result is that they do not chance to see the larger things, to wit, *the universe and its greater parts*. For they would not so greatly admire the former things, had they devoted themselves with due diligence to the contemplation of the latter; but would have reckoned all the former, small and trifling as the excellence of the latter became manifest. (*De Mundo*,† cap. 1; [I, 845-6].)

*All Swedenborg's quotations from Aristotle, in the present work, are taken from Du Val's edition of the OPERA OMNIA, containing the Greek text with a parallel column of Latin translation by various interpreters. Swedenborg invariably quotes the Latin translation. Du Val's edition was published in Paris, 2 vols., fol., 1619, and again in 1629.

Another edition, enlarged with editorial matter, was published in 4 vols., fol., in 1639, and reprinted in 1754. It was the edition of 1639 which was used by Swedenborg in making the citations in Codex 36.

†An English translation of this work by Taylor was published in London, 1812, and another by Forster, in Oxford, 1914.

The contemplation of the supreme world brings to the understanding neither fatigue, nor satiety, nor weariness; for in such contemplation nothing whatever is lacking. There the contemplating understanding beholds not one part only, but all that are most desirable; and by them it is affected with pleasure. . . . The more it contemplates, the more eager and admiring does it become; nor, in the beholding, is it fatigued but is more and more strengthened. (Aristotle, *De Secretiore parte Sapient. Div. secundum Aegyptios*,* L. XIV, c. xi [IV 674C].)

Plato said: Often, when my soul, leaving the body, has been in contemplation, I seemed to enjoy the highest good, and this with incredible pleasure. Wherefore I was in a manner struck with astonishment, perceiving in clearest light that I was a part of a superior world, and feeling myself to be endowed with immortality; which perception can neither be expressed in speech, nor perceived by ears, nor comprehended by thought. At last, wearied with this contemplation, the intellect fell back to its appearances; and then, with the ceasing of that light, I became sad. Once again, leaving the body and returning to that world, I perceived the soul abounding in light, and this light then flowing into the body, and afterwards raised up above the latter. . . . The soul, released from the body, ascends and is enlightened; descending, it comes into obscurity; but being afterwards purged, it again ascends.† (Aristotle, *De Secret. part. Divin. Sapient. secundum Aegyptios*, L. I c. iv, v [IV, 605, C. D.].)

*The DIVINE WISDOM, ACCORDING TO THE EGYPTIANS, is a work of disputed authorship, which is very frequently cited by Swedenborg, and in the present MS., p. 277, receives special praise at his hands. The work was included in the Latin edition of Aristotle's Works, published in Franckfurt, 1593, 9 vols., and in Du Val's Greek-Latin editions. The Greek text is lost and the Latin transla-

tion in Du Val is a revision or polishing up, by the English Aristotelian, Carpenter, of a Latin revision, by an Italian, which, in its turn, is a revision of a crude Latin MS. translation made by a Jew who had access to the Arabian MS. For further particulars respecting this work see New Philosophy, 1912, p. 143; 1913, p. 5.

†Quoted in *Anim. King.* 10.

Aristotle said, I am the friend of Socrates, I am the friend of Plato, but I am more the friend of truth. [Life of Aristotle, by Ammonius, in 1 Du Val, *prin.*]

THE ACCUSATION OF THE ATHENIANS AGAINST SOCRATES.

Socrates, being more curious than is right and proper, searches into things under the earth and in heaven; and by his discourse, he makes, the worse appear the better cause; and he teaches the same also to others. (Plato, *Apologia* [iii], p. 19 [B, vol. I; 1 Bohn 5].)

There are uninitiated persons who esteem that nothing exists except what they have grasped with their hands; but efficiencies of actions, and the generations and origins of things; in fine, whatsoever does not come under their eyes, this least of all, do they believe to be in the class of things that exist. . . . Truly such persons are exceedingly gross, and are strangers to the muses.* (Plato, *Theatatus*, p. 155, 156, [vol. I; 1 Bohn, 386.])

Much depends on the person by whom things are said; for the very same sayings and deeds are either most highly extolled or most deeply obscured according to the eminence or the obscurity of the persons that say or do them. (Pliny, *Epist.* [Lib. VI, Epi. xxiv].)

[Page 3.]

THE LITERARY ARTS, DISCIPLINES, DOCTRINES, SCIENCES.

THEOLOGY: Treats of God,—*Natural Theology*, by means of nature, and *Moral Theology* from the Divine Word.

PNEUMATICS: Treats of spirits, and also of souls.

PSYCHOLOGY: Treats of the nature of the soul; divided into theoretical, and practical or empiric.

ANTHROPOLOGY: The science of human nature and the commerce of soul and body.

METAPHYSICS: or First Philosophy.

LOGIC: The art of reasoning; also the searching of the intellect; divided into theoretical and practical.

ONTOLOGY: A lexicon of terms.

PHYSICS: Teaches the things of nature.

*Quoted in FIBRE, 142.

PSYCHOLOGY: Explains the things of the animus and imagination, the affections, etc.

MNEMONICS: An art for the cultivation of the memory.

ANATOMY: Concerns the bodies of the animal kingdom. Its divisions are: *Angiology* or *Anchiology*, on the arteries and veins; *Neurology*; *Myology*, on the muscles; *Adenology*, on the glands; *Osteology*, on the bones; *Gynecology*, on female congress; *Parthenology*, on virginity; *Embryology*, on birth; *Spermatology*, on the seed; *Herniotomia*, on castration; *Asititia* or *Adipsia*, on long abstinence from food and drink; *Splanchnologia* [on the viscera], it includes *Chylopoea* and *Uropoea*.

ACOUSTICS: Music.

OPTICS: *Dioptrics*.

MEDICINE: The healing art.

PHYSIOGNOMY: *Geomancy*: Pythagorean *Arithmetic*: Judicial *Astrology*.

ANALYTICS teaches what demonstration is. *Dialectics* or *Topics* show the art of reasoning by probable principles. The *Sophist* art, is topics corrupted. *Hermoneutics* is the art of interpreting the meaning of occult words. The *emblematic* art is exercised by means of intellectual effigies.

MATHESIS,—pure and applied.

GEOMETRY: *Trigonometry*.

STATICS.

ASTRONOMY: *Astrology*.

SCIATERICA:*

GEODESY: Geography.

MECHANICS.

[Page 4.]

ARCHITECTURE: Military, civil, and naval.

PYROBOLICS.†

Practical ARITHMETIC, Specious arithmetic or *Algebra*.

HISTORY: Natural, civil, ecclesiastical, literary, fabulous or *Mythology*.

*Defined by Hübner (*Reales Lex.* 1727) as the art of reading shadows or sundials.

†Now called *Pyrotechnics*.

THE LAW OF NATURE and Natural *Jurisprudence*: divine or universal law. *Civil law*. *Canon law*. *The law of nations*. *Civil Jurisprudence*. *Politics* for the governing of society. *Economics*. *Ethics* for manners and customs.

GRAMMAR: *Rhetoric*. *The art of poetry*. The art of making up fables, comedies, tragedies.

THE ART OF CRITICISM judges concerning the writings of others; it is also called *philology*.

CHEMISTRY. The art of *distillation*. *Pharmaceutics*, whence comes pharmacy; pharmacist, apothecary.

POLYMATHY,—multiple science.

THE SCIENCE OF SCIENCES. *Mathesis of universals*. *The doctrine of order, of series, and of degrees*.

Ethics or moral [Science]; politics or civil [Science] (Aristotle [*cf.* *Magn. Moral*, I, i, vi].)

He is a dialectician who looks into matters accurately, and has penetration into the nature of the things concerning which judgment is to be made.* (Plato, *De Repub.* L. VII, [c. xvi] p. 537 [C. D., vol. III; 2 Bohn 227].)

The natural law of Tobias is most admirable, as will be seen in Tobias [Tobit], ch. iv.

Rydelius.

Plato.

Aristotle.

Augustine.

Grotius.

Leibnitz.

Wolff.

Malebranche.

Cartesius (Des Cartes).

Bilfinger.

Sacred Scripture.

[Page 5, blank.]

[Page 6.]

*Quoted in FIBRE, 93.

THE SOUL.

DOCT. AND. RYDELIUS.*

The *passive faculties of the soul* are passions, sensations, representations, ideas, concepts, inclinations; for in all these the soul is passive.

The *active faculties of the soul* are determinations; for the soul is able to determine her thoughts to any object whatsoever, even against herself,—which the philosophers call reflection; for the soul is able to affirm, deny, and be persuaded.

Passive thoughts are of two kinds, namely, perception and inclination, the latter being called pathetic. Thus determination is added as a third part.

He distinguishes between lucid perception and ardent perception.

The soul possesses both sensation and reason; that is, it possesses many instrumental causes. But reason governs the senses. By the senses the soul acquires ideas of particulars, and the reason, composing these together, forms from them ideas general, more general, and most general. By the reason, the soul sees the generals of ideas; by the senses, she sees their particulars or units.

Had the soul remained in its primitive integrity, there would be no difference between art and nature.

Plato derived his connate ideas from souls, to wit, that they were inserted by heaven into bodies, where they had remembrance of their past deeds. It is impossible that this can be the soul, for souls have no connate idea of truth and falsity.

*In all the citations from Rhydelus Swedenborg gives merely the author's name without mention of any particular work. DR. O. WIESELGREN, the Keeper of the manuscript department in the ROYAL LIBRARY OF STOCKHOLM, has kindly examined these citations, and he writes that they "are not taken verbatim from any work by Rhydelius, but merely

present, in general terms, the philosophical opinion of which Rhydelius made himself the advocate, and which he has set forth, partly in a number of academical treatises, and partly in his chief philosophical work, NODIGE FÖRNUFTSÖFNUNGAR (Necessary exercises of the Intelligence), first published in 1718, and afterwards in 1737 and 1766. Several of the

AUGUSTINE.

Speaking against those who believe the soul to be contained in no place, Augustine says: Thus the eye, being body, is passive—though not in its own place,—only to that to which it never would be passive without the soul.*. . . Who can deprive me of the knowledge that I myself am a soul. . . . He relates how that in the country of Liguria some of his students found a little insect furnished with a great number of legs. When one of the students cut this little worm in two, the several parts went off in opposite directions with as speedy a motion of their legs as if they had been two separate creatures. (*De Quantitate Animae*, C. xxx, xxxi [I, 233G, 234A**].)

The FIRST DEGREE of the soul vivifies this earthly and mortal body by its presence; gathers it into a one [and holds it therein]; does not suffer it to flow apart [and decay]; causes the foods to be equally distributed through its members, each member receiving its own; preserves its harmony and mode, not only in respect to beauty, but also in respect to growth and birth. All these properties, however, are common to men and plants. . . .

The SECOND DEGREE: The soul extends itself for contact, and thereby sensates and discerns things hot, cold, sharp, smooth, hard, soft, light and heavy. She then makes distinctions between the innumerable differences in savours, odours, sounds

definitions and distinctions that we meet in Swedenborg are found in Rhydelius, as, for instance, the classification of *sensus* into *externus*, *internus* and *intimus*; the distinction between *perceptio lucens* and *ardens*, etc." We may add that Rhydelius' *OPUSCULA LATINA* was published in 1778, but we have not had access to this work.

*Augustine's argument is that to blows or affections of its humors, the eye is passive in the place where the blow or humor

actually is; but then it would be equally passive to them were the soul not present. In the case of sight, on the other hand, the eye is passive to the objects of sight but *not* where they actually are; and this passivity (or sight) is not possible without the soul. Therefore the soul is in the body.

**The page notations added by the translator, refer to the Latin edition of Augustine published by the Louvain Fathers in 10 tomes, Fol., Col. Agrip. 1616.

and forms. And in all these she takes in and appetises those that accord with the nature of her body, and rejects and flees all that are opposed. She removes herself from these senses by a certain interval of time; and the images of things which she has drawn in by the senses, she revolves within herself in crowds and multitudes; this whole operation being sleep and dreams. . . . She does what she can for the copulation of the sexes. She conspires for the begetting of children, and also for their care, protection, nourishment and preservation, etc. But here again, no one denies that the soul can do all these things in brutes also.

[Page 7.]

The THIRD DEGREE is the memory of things, the keeping in mind the innumerable arts of the workman and of the cultivator of the soil; invention of innumerable signs in letters, words, gestures, sounds, pictures, statues, etc., etc.

The FOURTH DEGREE is that from which commences goodness and all true praiseworthiness. For from this degree the soul ventures to set herself not only over her own body, in that she actuates a part of the universe, but also over the universal body; [to think that its goods are not hers, and to judge and condemn them as compared to her own power and beauty]. Hence the more she enters into her own delight, the more does she withdraw herself from uncleanness . . . to set store by human society; and to desire that nothing shall happen to another which she would not have for herself.

The FIFTH DEGREE. In this degree, with a certain great and incredible confidence, she turns to God, that is, to the contemplation of truth; and this, for which she has undergone so great labour, is her deepest and most precious reward. This operation, that is, the appetite for understanding the things that truly and supremely are, is the highest prospect before the soul, than which she has none that is more perfect, better, or more righteous.

The SIXTH DEGREE is that of action, that is,* the directing of a serene and upright gaze upon that which lies before the sight. For that spirit, I hold, is upright in which it has come to pass that the soul cannot deviate or wander in the search of truth. . . . But the thought must first restrain and free itself from every cupidity, and from all the impurity that pertains to mortal things. [And then it is in the vision and contemplation of the truth itself. This is]

The SEVENTH DEGREE [which is not a degree but] is that mansion to which one comes by these degrees. Here what joys there are! what fruition of truth and of the highest good! a breathing of what serenity and eternity! . . . When we understand this, then shall we truly see that all things under the sun are the vanity of vanities. (*De quant. an.*, c. xxxiii [I, 235-236].)

Of all things created by God, nothing is nearer to him than the soul: . . . And if at times something is better than the soul, this is the result of sin, not of nature (*ibid.*, c. xxxiv [I, 236 H.].)

But these degrees can be expressed in a different way, namely: *First*, Action, for the sake of teaching; this is called animation. *Second*, Sensation. *Third*, Art. *Fourth*, Virtue. *Fifth*, Tranquillity. *Sixth*, Entrance. *Seventh*, Contemplation. Or the *first* concerns the body; the *second* is by means of the body; the *third* is concerned with the body; the *fourth* is toward herself; the *fifth* into herself; the *sixth* toward God; the *seventh* is with God. (*ib.*, c. xxxv [I, 237 B.].)

In foolish men there is indeed a mind; for they do things that never could be done without a mind; yet they do not rule, for they are stupid. Nor, as is well known, is there any kingdom of the mind except in the case of the wise. . . . The kingdom of the human mind, is human wisdom. (*De Lib. Arbitrio*, C. ix [I, 242 C,D].)

*Swedenborg here omits the following words, for which he substitutes "that is": "for it is one thing to cleanse the eye of the soul that its gaze be not vain

and shameless and its sight depraved; to guard the soul itself and make firm its sanity; and another to direct a serene and upright, etc."

That the whole of the soul is present in the whole body, and in all its several parts, see *De immortal. Animae*, C. xv [I, 221].

Although there are two, soul and body, neither can be called man without the other; [yet it may be that one of them may be held to be man]. What then do we call man? Is he only body, as being for the use of the soul that rules it? just as we give the name lamp not to the light and container together, but to the latter only, though on account of the light? (*De moribus Ecclesiae Catholicae* L. 1, C. iv [I, 287 C.D. *Manichaen Heresy*, pp. 4-5*].)

A nature is not immutable which in any manner, from any cause, or in any part is liable to change. But it is impious to think of God as otherwise than truly and supremely immutable. Therefore the soul is not a part of God. . .

If the term body means every substance or essence, or, to more fitly designate it, that which in any way has existence in itself, then the soul is a body. Again, if you choose to give the name incorporeal only to that nature which is supremely immutable, and is present everywhere in its entirety, then the soul is body; for she has no such quality. Further, if the term body designates only that which is presented or moved through space in some length, breadth and thickness, so that with a greater part of itself it occupies a greater space, and with a smaller part a smaller space, and so that it is less in the part than in the whole, then the soul is not body; for she pervades the whole of the body which she animates, not by local diffusion but by a certain vital extension; for the whole of the soul is present simultaneously through all its parts; nor is she smaller in the smaller parts or larger in the larger; but,—more intently in one place and more remissly in another,—the whole of her is present in all the parts, and the whole of her in each of them. For even what the soul perceives is only a part of the

*The English references added by the translator are to Clark's edition of Augustine's Works in English (Edinburgh, 1871-1876).

This edition does not include all the works, nor those doubtfully ascribed to Augustine.

body, is nevertheless no otherwise perceived than by the whole soul. . . . If therefore the soul is to be called body, it is certainly not body in the same sense as an earthly body; or a watery, aerial or ethereal. . . . Hence we see that the soul, whether it be called body or incorporeal, has its own peculiar nature created from a substance more excellent than all the elements of this mundane mass,—a substance which cannot be thought of as being in any appearance of corporeal images such as we perceive by the senses of the flesh, but which must be understood by the mind and perceived by life. (*Epist.* xxviii, [II, p. 34; *Letters* (Let. 166) II, 298-9].)
(Page 8.)

Nothing must be believed incorporeal and invisible by nature excepting God alone; . . . who therefore is rightly held to be incorporeal, because He is everywhere, and fills and bounds all things. . . . Every creature is corporeal. Angels and all heavenly virtues are corporeal, although they do not live in the flesh. We believe them to be corporeal from the fact that they are circumscribed by space; as also is the human soul which is enclosed in flesh; and likewise demons, who by substance are of an angelic nature.

We believe intellectual natures to be immortal because they are without flesh; nor do they have that whereby they die and thus need the resurrection which is so necessary after death. The souls of men did not exist from the beginning among other intellectual natures; nor were they created together with them, as pretended by ORIGEN; nor inseminated together with their bodies by coition, as presumptuously affirmed by the LUCIFERIANS,* CYRILL and other Latin writers, who write as though they were defending the effects of nature. But we declare that the creation of the soul is known solely to the creator of all things; and that by the act of marriage the body only is inseminated; but by the decree of God it is coagulated

*The Luciferians were a sect founded about the middle of the fourth century by LUCIFER, a Christian bishop in Sardinia, for

the purpose of completely separating from all who had any sympathy with Arianism.

in the vulva, and framed and formed; and when the body has been formed, the soul is created and infused into it, so that it lives in the womb, a man consisting of soul and body; and passes out of the womb, a living being full of human substance.

Nor do we hold with JACOB and others of the Syrian writers, who say that in every man there are two souls;—an animal soul, whereby the body is animated, and which is commingled with the blood; and a spiritual soul which supplies the reason. But we declare that in man there is one soul and one only, which both vivifies the body by association therewith, and disposes itself by its own reason,—a soul possessing in itself liberty of choice, so that in the thought of its substance it can choose what it wills.

We believe that man alone has a substantial soul which continues to live after the body has been laid aside, and retains, in lively way, its senses and endowments. Nor does this soul die with the body, as asserted by ARATUS; nor, as ZENON says, after some interval of time; for it lives substantially.

The souls of animals, on the other hand, are not substantial, but they are born with the flesh itself and with the life of the flesh; and they come to an end and die, with the death of the body. Therefore they are not ruled by reason, as supposed by PLATO and ALEXANDER, but are led to all things by the incitement of nature. . . .

Man consists of two substances only, namely, soul and body,—the soul with its reason, and the body with its senses; which senses, however, are not moved by the body, without the association of the soul. The soul, on the other hand, retains its rationality even without the body.

There is not a third spirit in man's substance, as contended by DIDYMUS:* but the soul is itself called spirit, by reason of its spiritual nature, and by reason of the fact that it inspires

*DIDYMUS OF ALEXANDRIA, called the Blind, *circa* A. D. 311. He wrote a work in which he maintained that the Holy Spirit is not

a mere name, but is a real existence which is the cause of wisdom and godliness with man.

the spirit into the body; while it is called soul from the fact that it animates the body to life or vivification. That third spirit which is spoken of by the Apostle, together with the soul and body [I. *Thes.* v, 23] we understand to be the grace of the Holy Spirit for which the Apostle prays that it may continue in us entire. (*De Definitionibus Fidei, sive Ecclesiasticis Dogmatis*, c. xi-xvi, xviii-xx; [III, 330].)

It has come to pass that some have asked, What part of the body has the greater power in the body; and they have thought this to be the mind, or the whole soul altogether,—as was the opinion of EMPEDOCLES and ERICATES. . . . Others believe that the soul is made up of minute individual corpuscles, which they call atoms, meeting together and cohering. Some have said that the substance of the soul is air, and others that it is fire. Some have declared that it is not a substance, since they can think of no other substance than body, and they have found that it is not body; but that it is the tempering together of our body, or the combining of those primordial elements whereby its flesh is connected together, eac. (*De Trinitate*. L. X., c. vii [III, 127; Trinity 251-2].)

We believe that the nature and substance of God is altogether immutable. But as regards the nature of the soul, who doubts but that it is mutable either for better or for worse? And for this reason, it is a sacrilegious opinion that believes the soul and God to be of one substance. For in this way, what other belief results than that He also is mutable? We must therefore believe and understand, nor in any way doubt, what a right faith teaches, that the soul is from God as a thing made by Him, and not as a nature the same as His own,—whether he beget it, or put it forth in some other way. (*De Genesi ad Literam*, L. VII, c. ii [III, p. 211 EF].)
[Page 9*.]

Whether God made the soul from that which had no existence whatever, that is, from nothing; or from some thing

*The four pages that follow we print them in their order as page 8 are marked 11, 12, 9, 10, paged.
respectively. In the translation

which, being already made by Him, existed spiritually (*Spiraliter*), but was yet soul, is a question worthy of enquiry. For if we do [not] believe that God created something else from nothing, after He had created all things together; and if we believe that after all the works which he had begun to make, were finished, he rested from this work, so that whatever he made afterwards was made from these; then I do not see in what way we can understand, how that afterwards he made souls out of nothing. Must we not say . . . that in the natures which already had come into existence, he created the reasons of other natures yet to be, and not the natures themselves? Otherwise, if they had already been created there, as they were to be in the future, they were not yet to be. And in that case, there was not as yet in established things any nature of a human soul; and this began to exist, only when God made it by breathing, and imparted it to man, etc., etc. But as to this spiritual (*spiritalis*) material,—if any there was from which the soul came into existence, or if any there is, from which souls now come into existence,—what is it? what is its name? what its appearance? what use does it perform among created things? Is it living or not? If living, what does it do? what does it contribute to the effects of the universe? Does it lead a blessed life? or sad life? or neither? It vivifies something; does it rest from this work also? . . . For if there was as yet no life at all, how could there be an incorporeal and non-living matter of a life to be? Either the position is false, or the matter too occult, etc., etc. (*De Genesi ad Lit.* Lib. VII, c. v, vi [III, 212 AD].)

He then discusses whether the soul was made from elements, or from air, or from fire, angels, etc. (*Ibid.*, c. xii-xxviii.)

(*To be continued.*)

THE BRAIN.

BY EMANUEL SWEDENBORG. (*Continued.*)

170. 44. By the direction of this axis, the motion of the expansion is determined beyond the surface of the cerebrum towards the first and second processes of the dura mater. For the surface of the cerebrum, being divided up into serpentine tumuli, can certainly expand and raise itself into the space between meninges as far as the lacunæ of the bones; and it can then fall back on itself and its folds. That there is such a determination of its elevation, is evident, [1], from the sagittal and coronal sutures, and also the lamboidal,* which are quite clearly seen, and easily opened in the embryo and young infant. [2], From the hollowing out of the cranium on both sides of the longitudinal sinus; [3], From the impressions left by the arteries of the dura mater, which are conspicuous in the region of the temporal bones; [4], From all four sinuses of the upper part of the cerebrum,—that is, the first four,†—which must be in the stream of its motion; [5], From the division of the hemispheres by the falciform process of the dura mater; and from the division of the two brains by the second process of the same mater; [6], From the extremity of the axis itself in the occiput, where the sinuses and the above mentioned processes come together; [7], From the direction of the fibres of the dura mater, and of its muscular fibres, from the processes to their periphery; [8], From the ossification, extending from the centre of the axis in the parietal bone, and from its periphery in the coronal. Since, therefore, the determination of this motion is towards the

*The sagittal is the longitudinal suture between the two parietal bones; the coronal, the transverse suture between the parietal and frontal bones; and the lamboidal, the transverse suture between the

parietal and occipital bones.

†The longitudinal was called the First sinus, the two lateral, the Second and Third, and the torcular Herophili, the Fourth.

falciform process, and, at every turn, this process is alternately expanded and constricted; and since the beginning of the process is in the crest of the ethmoid bone, or, on the one side at the end of the coronal spine, and, on the other, in the middle of the occipital bone; it is evident how that, attracted by such determination, spines and crests have swollen up; how that, by the like leadings, have been excavated those frontal sinuses which, according to J. DOMINICUS GAGLIARDI, are found in the internal lamina;* how that they have been separated by a septum, and a communication opened with the little cavities of the nose; how that the diploe has distinguished the lamina in their own places; and, since the semi-circular coronal bone† is surrounded with sutures,—if you add the transverse sutures between the eyes,—how that, in the embryo, this frontal part, being endowed with the freest animation, moved back and forth by reason of the systole and diastole of the falx and its sinus,—which freedom it also asserts in the infant by means of the fontanelle. For if, in respect to volume, a greater and at the same time a freer animation exists in the embryo, when the cranium has not yet receded to its due distance from the cerebrum, then an intermediate space of this kind, irregularly quadrangular and not ossified, would be left between the parietal and coronal bones; and the sutures would not collapse and be made firm by little pegs, except gradually. Moreover, it will be evident that, in the event of the bosses of the cerebrum which lie under the coronal bone, failing to act as one cause with the rest of the cerebrum which lies under the parietal bone; and, failing, in their expansion, to duly bend towards the sinus of the falx; a certain frontal suture divides the bone all the way to the root of the nose, and the frontal sinuses

**Anatome Ossium*, Leiden, 1723, Cap. ii, Obs. i; also in MANGETUS, *Bibliotheca Anatomica*, Geneva, 1699, Tom. ii, p. 121; and *Theatrum Anat.*, Geneva, 1716, tom. i, p. 73. Gagliardi observes

that the cavities in the frontal bone are found, not between the outer and inner laminæ, but between the two layers of the lamina facing the brain.

†The frontal bone.

are wider, or undergo some other variety. Since, therefore, the expansion on each side is determined towards the falx, that is to say, where the cerebrum can fold and unfold itself by means of the great fissure between the hemispheres, it becomes evident why it is, that only in those places does it join itself, by the interjection of fibres and vessels, with the dura mater, the process, and the sinus. The expansion of the cerebrum is also simultaneously determined towards the second process* of the dura mater; consequently, it advances towards the fourth sinus, concurrently with the former animation, and, at the fourth, and at the same time, at the lateral sinuses, it is concurrent with the animation of the cerebellum; for which reason the dura mater there comes down almost quadrupled. This direction is also manifestly clear from signs displayed in the cranium itself, both during growth and after formation.

171. 45. For the rest, that the animation of the cerebrum is also determined within its own surface towards the medulla of the spine, this is effected principally by the beginnings of the medulla oblongata; that is, by the corpora striate and the thalami of the optic nerves, by means of the expansion and constriction of the anterior ventricles. In the promotion of this determination the cerebellum performs the principal work, and with it, the medulla oblongata. Thus from all these parts, there proceeds a determination into the nerves and into the provinces of the whole body; but the internal determination of the cerebrum itself, seems to be principally directed towards the members of its chemical laboratory. For the present, however, I desire merely to mention these points without experimental confirmation, and this for the sake of the connection. They will be treated of later on.

172. 46. That these determinations of motion do not exist until the cerebrum has taken in red blood, and the heart has begun to quiver; that is, until the cerebrum and heart act as one cause for the forming of the diminutive animal machine, is clear to some extent from the observations of MAL-

*The tentorium.

FIGHI and HARVEY on the successive formation of chicks in incubated eggs. For when the heart begins to appear, the zones in the vertex become discontinuous, and the vesicles make room for the longitudinal sinus, exactly according to Malpighi's conclusion [n. 174 u; cf. also k and s]. During the first hours, the highly delicate cerebrum seems actually to possess hardly any other determination than one that derives it into the spine, and, by means of its own vesicles and zones, conducts, both to itself and to that spine, [first] a most spirituous essence which is the first essence of the blood, and afterwards an essence compounded of this highly spirituous essence, together with another and accessory essence which is also called the white blood; for according to microscopical experience, it is into this, that the red blood is resolved. It does not seem at this time* that the sinuses of the dura mater, whereby the blood is carried off through the jugular veins towards the heart, are as yet formed; consequently neither yet can there exist any determination towards any process and sinus of the falx, nor towards the transverse septum.† But the [cerebrum's] determination generally, is in the direction whence it draws its essences, and whither it transmits them; that is to say, towards the medulla of the spine. As soon, however, as it compounds the white blood into the red, that is, when the cerebrum has grown to such size that it is due to admit the third degree of composition in the blood, then for the first time does it seem to take the heart into association with itself, and to open its sinuses, and extrinsically determine itself towards them, and no longer towards its own interiors and the medulla of the spine; for at the same time the cerebellum is added, and this continues the determination towards the afore mentioned spine.

173. 47. Consequently, prior to the derivations of the red blood, the constituent and nutrient essences seen to be con-

*After these words the MS. contains the following passage, which is crossed off by the author: "that the heart as yet act-

ually exists, and still less, that the cerebrum transmits thither the afore mentioned essence."

†The tentorium.

ducted through the engirdling membranes; for the carina is at once surrounded with zones, and to these are applied vesicles, from which a passage is afforded into the zones, which latter are like teguments to the cerebrum and medulla spinalis. Similar also appears to be the circulation of the liquors after birth, that is to say, through membranes,—the periosteum and the involucra of the medulla spinalis,—into the dura mater, and at the same time into the pericranium; in which circle they seem to wish to retain their pristine nature. On this subject see below. But the nature of the determination of the animatory motion of the cerebrum before the making of the red blood, and its nature before the making of the white blood, are matters that can hardly be followed up, even by guessing, except in the most obscure way; nor will any such thing come into true light, until we are able to learn it by means of a certain universal mathesis, or a philosophy of universals, indefinites or degrees,—as we shall call it,—by the medium whereof we can designate by signs those things in prior nature, and the nature of causes, which analogically refer themselves to visible phenomena and effects. This is the science of sciences, embracing all other sciences, and as yet unknown to the world.* Meanwhile, as some confirmation of our theorems, and especially of the last two, I wish to subjoin the entire Malpighian experience concerning the formation of the cerebrum and heart in the chick.†

174. 48. (a) "AT THE END OF SIX HOURS . . . the rudiments of the carina‡ and head of the incubated chick emerged under the appearance of a zone [Fig. 2, C], swimming in a colliquamentum of a leaden color, which was held in a circle [D] as by a kind of dam. . . .

(b) "AT THE END OF TWELVE HOURS . . . , the carina, defined by white zones, displayed a small round head; and beyond its middle, it exhibited for the first time, the orbicular

*For further particulars respecting this science, see the author's *Psychological Tracts*, pp. 10 and 163.

†In the quotation that now fol-

lows, the italics are Swedenborg's. For convenience of reference we have divided the quotation into paragraphs designated by letters.

‡Now called the **Primitive streak**

vesicles of the vertebræ situated on both sides [Fig. 4, C] . . . In other cicatricula thus incubated . . . the carina of the chick was designated by a kind of white zone; and the growth of this as a twofold tumor, showed the rudiments of the head [Fig. 5, M], and had the globules of the vertebræ attached to it on both sides [N].

(c) "AFTER THE PASSAGE OF EIGHTEEN HOURS . . . from the white zone appeared the head [Fig. 6, D], and also the tracts of the spine, with the attached sacculi of the vertebræ [E]. . . . The zones were not elevated perpendicularly, but were inclined, and thus produced a concavity in the carina which was filled with a kind of crystalline humor, sometimes so swollen as to disrupt the containing zones and give rise to new areas. Another point to be noted is, that the zones leave a gap at the apex [Fig. 13, A], which sometimes, and in the course of time, was closed. *Nature perhaps uses this gap for the entrance of the colliquamentum.* . . . In this same egg, after being exposed to the air for six hours, the gap was closed; . . . while in the incubated egg, the passage was closed after the lapse of a day [*De Ovo Incubato*, in *Opera Omnia*, Lugd. Bat. 1687, pp. 76, 77, 78].

(d) "AT THE END OF TWENTY-FOUR HOURS the protuberance of the head [Fig. 11, A] emerged, and, with the drawing apart of the zones [B] in the back,* a groove was formed in the carina, which provided room for the spinal marrow [C], to which were attached the vesicles of the cerebrum [D]. . . . *The tuberos swellings about the head were multiplied.* . . . *A portion of the heart* [Fig. 17, D] *was seen outside the carina, appearing like a hook;† and in the umbilical area were seen varicose vessels turgid with a pale and yellowish ichor*" [pp. 77, 78]. *Although I seem to have detected*

*That is, in the vertebral column. by Swedenborg to describe the appearance of the heart, as

†The last four words are added shown in Malpighi's figure.

*the motion of the heart, yet I dare not affirm this with certainty** [p. 56].

(e) "AT THE END OF THIRTY HOURS . . . the umbilical area [Fig. 18, A] was covered with varicose vessels [B]. . . . The color of the vessels was at first yellowish, and then rust-like. . . . In the head at the place where two appendages had been observed, were seen the eyes [Fig. 19, A]. After various areas had been formed, the united zones surrounded the five vesicles [B] of the cerebrum, and of the medulla spinalis [C] produced therefrom. At the extremity of the latter, a dilated angular area [D], afforded room for the loosened medulla. The saculi of the vertebræ were at the sides. *At this time also the heart [E] was clearly perceived.* . . . I am still of doubtful mind in the matter of determining the priority of the heart and the blood. . . . One thing, however, is clear, namely, that, before incubation, the stamens of the carina are observed, and that afterwards, in the course of incubation, the vertebræ, the rudiments of the cerebrum and medulla spinalis, together with the wings and a fleshy covering, come to view, while the heart, vessels and blood are still hidden from view. But with the appearance of little streams in the umbilical area, it is probable that the heart also is appended to the carina; for before the thirtieth hour, I have detected the structure of the heart with certainty. *Much time elapses, however, during which the heart and vessels are pervaded by an ichor now yellow, now of the rust-colored, and appearing finally as red blood.* Hence I still favor the conjecture that the juice, the vessels, and the heart, probably pre-existed; and that they

*This sentence is quoted from Malpighi's account of his first experiments with the incubated egg, where it occurs at the end of his account of the development at the end of 24 hours. Malpighi's first experiments, from which are taken the citations made in n. 75 above, were set forth in a letter to the ROYAL PHILOSOPHI-

CAL SOCIETY, of London, dated February, 1672. His second experiments, made for the purpose of checking up the first, are described in a letter to the same Society, dated October, of the same year. It is from these latter that the present citations are taken, with the single exception of the sentence noted above.

come to view gradually,—as we observe in the case of eggs in trees.*

(f) "AT THE THIRTY-SIXTH HOUR the cicatricula exhibited†—[an umbilical area covered with vessels, Fig. 20, A]. . . . In the head, the topmost vesicle [Fig. 21, C], was turgid with a lead colored ichor. The other vesicles [D], which were often smaler, were filled with a transparent humor; and the medulla [E], which is their continuation, was somewhat dilated [at F],—as is also observed in the mature chick. There was considerable flesh [G] around the upper part of the carina and the heart, [H] was slightly protuberant from the rest of the body.

*MALPIGHI appears here to refer to a statement at the end of his treatise, *De Gallis* (On Galls, or vegetable excrescences) to the effect that, in trees and other plants, there are many insects' eggs which give no sign of their presence, but which, subsequently, cause galls and other diseases.

†Four leaves or eight pages (217-224) are here missing from the MS.; but the opening words of p. 225 (n. 174 below) plainly show that the missing pages contained no more than the continuation of Malpighi's observations. We have, therefore, supplied their contents from Malpighi's work,—being guided in this by the citations as published by Swedenborg in I. ECON. OF ANIM. KING., 243. We have, however, added a few sentences omitted in the quotation as given in the ECONOMY; for on comparing the quotation in the preserved pages of the present MS. with the same quotation as given in the ECONOMY, we find that the former is somewhat fuller. But even with the few addi-

tions we have inserted from MALPIGHI, the remainder of the citation, as printed in the ECONOMY, would hardly fill more than four pages. We find, however, that if, in addition to continuing the citation from Malpighi's second observations, which Swedenborg commences in the extant pages of this paragraph, we add,—still using the ECONOMY as our guide,—the continuation of the citation from his first observations, commencing at the point where, in n. 75 above, Swedenborg left off, the total additions would about fill eight pages of the present MS. It is not at all improbable that Swedenborg did actually add to n. 174, in this way; for in n. 172, he refers to "Malpighi's conclusion" that the vesicles make room for the longitudinal sinus,—which conclusion is contained only in Malpighi's first observations, and is not included in the citation therefrom made in n. 75; and the same also applies to the references to Malpighi in n. 180.

(g) ["AT THE END OF FORTY HOURS, the propagations of the veins, which had now become plainly observable in the cicatricula, were derived by productions, [Fig. 22, B] from the extreme border, [A], into the heart; and the umbilical vessels arising from the heart and forming the angle [C], gave off reticular branches, not as yet distinguished into any offshoots of larger size. . . . In the head, the usual vesicles of the cerebrum were turgid, and the first of them appearing like glass, seemed to float upon the others. The usual zone, now becomes narrower, surrounded the cerebrum and spinal marrow. The eyes, [Fig. 23, F], were situated on either side. The turgid heart, [C], pulsated in the same way and with the same rhythm as described elsewhere.* . . .

(h) ["In the SUCCEEDING HOURS up to the END OF THE SECOND DAY, the varicose umbilical vessels became first of a yellowish color; then rust-like, and finally sanguineous. The turgid vesicles of, [Fig. 25, A], of the cerebrum, were continuous with the spinal marrow, which was surrounded by the still existent zones, [C]. The black circle in the open gap, [D], surrounded the circuit of the eye.

(i) ["AFTER TWO DAYS . . the chick was enriched with vesicles which completed the cerebrum, [Fig. 26, B]. To these was added the cerebellum, C, with the medulla spinalis, D, which was guarded by the zones E. . . . Near the extremity of the carina, the medulla, now become more ample, was extended into an oval shape. . . . The heart pulsated quite distinctly. . . .

(j) ["AFTER THE LAPSE OF THREE DAYS . . the tract of the spine, Fig. 31, B, derived from the cerebellum, C, was plainly observed, with the vertebræ, D, together with the zones, E, attached on either side. The cristate vesicle of the cerebrum, F, which was transparent, became more distinct than the others, and was swollen with humor. The other vesicles, G, were also plainly observed. . . . The heart had grown larger, and the blood received from the vein, Fig. 32,

*That is, in Malpighi's first observations at the fortieth hour; see n. 75 above.

M, by the auricle, L, was propelled by a duct into the right ventricle of the heart, and from thence, through O, into the left ventricle, P, and finally into the arteries, Q, whence it passed into the trunk, R. From this trunk sprang the umbilical branches, S, which, after dividing into twigs forming a reticular plexus, terminated in the border. . . .

(k) ["AFTER THE FOURTH DAY . . . the ample blood vessels and the veins, which, for the most part, were more capacious, prevailed the border, especially with their large trunk, the excurrent blood being mingled with a yellowish humor. . . . The head was more turgid than the other parts; for the cristate vesicle, Fig. 36, A, which was seen to be divided into two parts, was filled with a cineritious and slightly concreted substance. Not far therefrom, a little lower down in the occiput, was situated the second vesicle of the cerebellum, B, underneath which was a portion of the spinal marrow, C. On the anterior part and still lower down, lay the vesicle D; and two other vesicles, E, likewise terminated the apex. . . . Not far from the head, the heart, L, protruded from the open chest. . . . Its structure was plainly made up of muscular flesh. From the abdomen issued the umbilical vessels, the more capacious being the artery, which was swollen with red blood; while the vein, which was situated below it, and was narrower, was filled with a yellowish humor. . . .

(l) ["AFTER THE PASSAGE OF THE FIFTH DAY . . . the head was large, and was completed by the cristate vesicle, Fig. 38, B. This vesicle was filled with a filamentary substance. Attached to it was the cerebellum, C. Anteriorly were seen the two vesicles of the apex, D, and above and deeper in, was set the vesicle E. The eyes, F, were seen on either side, and the rest of the body was covered with flesh, with the wings, G, and legs, H, attached. Outside the open thorax was situated the heart composed of a right and left ventricle, Fig. 39, I, K, with the auricle, L, slightly above them. The viscera were more plainly seen, especially the lungs which were of a reddish color. . . .

(m) ["AT THE END OF THE SIXTH DAY . . . was seen the

usual structure of the vesicles of the cerebrum. The cristate vesicle, Fig. 41, C, was irrigated by a large vessel, and the vesicle next to it, D, was overshadowed, nor could it come to view unless the cerebrum were laid bare and cut open, Fig. 42, D. . . . The heart was seen in the still open thorax; its left ventricle, Fig. 43, F, drawn downwards and dilated, was incumbent on its associate ventricle, E, with the auricle, H, extended over it. . . .

(n) ["AFTER THE SEVENTH DAY, the several parts became clearer. . . . The cristate vesicles, Fig. 44, G, were composed externally of a fibrous substance, while interiorly their cavity was swollen with ichor. . . . The cerebellum, together with the beginning of the spinal marrow, was now solidified. The thorax was pointed, and within it, pulsated the heart covered with a slight pellicle. . . . The two ventricles were situated side by side, the left being the larger and redder; but in the case of the auricles, the right was the more capacious. . . .

(o) ["ON THE NINTH DAY . . . the heart had its ordinary form. . . .

(p) ["AFTER THE NINTH DAY . . . the cristate vesicles of the cerebrum, Fig. 49, E, which terminate in the origin of the optic nerves,—now become smaller and more deeply seated, were bent to the sides. The same was the case with the anterior vesicles, F. The base of the cerebrum, which was now nearly solidified, presented the following appearance: The anterior vesicles, Fig. 50, G, were seen, and likewise the beginning of the optic nerves running from the cristate vesicles, H, to the eye. A portion of the infundibulum formed by the contiguous vesicle, straightened the continuity of the cerebrum; and not far from this was the beginning of the spinal marrow, K. . . .

(q) ["AFTER THE LAPSE OF THE FOURTEENTH DAY . . . the lungs were observed of a whitish color. . . .

(r) ["ON THE SUBSEQUENT DAY, all the parts became firmer. . . . The cerebrum, now solidified, exhibited on its upper part, the roots of the optic nerve, Fig. 56, A, now become more slender; the anterior ventricles, B; the cerebellum, C;

and the beginning of the medulla spinalis, D; and, at the base, beyond the part shown by the figure, came the region of the infundibulum" (pp. 78-83).

[To the above, is here subjoined the continuation of Malpighi's first observations, which were quoted in part in Transaction I, n. 75.*

(s) ["AT THE END OF THE THIRD DAY, I found the chick with its body curved and prone. In its head, Fig. 17, A, beyond the two eyes, B, were five vesicles, C,—of which the cerebrum is composed,—swollen with humor. . . . The situation and form of these vesicles was as follows: In the vertex of the head was a somewhat large vesicle irrigated with little vessels, and like to a hemisphere. On the following days this was divided into two quasi vesicles. Hence I am still in doubt whether, in the beginning, there is only one vessel, or whether there are two. In the occiput was added a triangular quasi vesicle, G; but the lowest part of the sinciput was occupied by an oval vesicle next to which were placed two others. . . . The construction of the heart was as I here show it, Fig. 17;—the mystery of nature, to which I alluded above, being this day made clear. For the auricle, L, receiving blood from the veins, M, pulsated with a kind of double motion, as though distinguished into two chambers, and thus the blood was propelled into the heart in a peculiar way which needs further investigation. . . .

(t) ["AFTER THE FOURTH DAY the chick came into clearer view. The five vesicles constituting the ample cerebrum were more plainly apparent, had come nearer together, and when pierced, let out an ichor. . . . The round tumors of the vertebræ were more protuberant. . . . The progress of the vena cava and aorta within the body was hidden from view, and a little cord of umbilical vessels issued from the abdomen; the blood propelled through the arteries was stained with a rich red color, but that which returned through the veins was of a yellowish hue. Within the body was seen the rudiment

*See n. 174, f.

of the liver. In some instances the heart, Fig. 18, H, was pendulous on the outside of the thorax, and its auricles, I, being brought nearer to it, received blood from the veins, K, and supplied it to the heart's ventricles; for the right ventricle, L,—now assigned its usual figure,—was connected with the left, M, which latter, growing broader, with the retraction of the beginning of the aorta, N, gradually assumed its due shape. In other and more vigorous eggs, the cavity of the thorax was closed by a thin covering, and the heart was concealed within it, the left ventricle, hanging downwards, and lying upon the right.

(u) ["AFTER THE SIXTH DAY, the chick lay in the amnion, Fig. 19, A, having a large head, whereof the great vesicle, Fig. 19, B, being twinned as it were by the long fissure which had arisen, afforded room for the sickle-like falx, and when lacerated gave out no ichor. The two anterior vesicles of the cerebrum, C, now become less protuberant, were somewhat obscured by the incipient growth of flesh, and attached to them was seen the rudiment of the rostrum; an intercepted vesicle lay deeply concealed, as also was the case with a fifth vesicle located in the occiput. The spinal marrow, divided into two parts and consolidated, extended through the length of the carina. . . . The umbilical vessels, F, which issued forth, were derived, partly to the thin albumen, S, surrounding the yolk and amnion, and partly to the yolk, H; and the arteries, now become more slender, were much smaller than the veins. In the abdomen, the structure of the liver began to be more plainly manifest. . . . The heart lying within the body, although mucous, pulsated in its two ventricles, on which depended the muscular auricles, now aroused to a double motion and quite large in size, together with white vessels. . . .

(v) ["AT THE END OF THE SEVENTH DAY the chick was furnished with a head of considerable size, and the cerebrum, Fig. 20, A, being contained in its usual covering, was also more protuberant. On lacerating these coverings, the ichor, so lately fluid, was found to have concreted into solid fila-

ments which produced the walls of the ventricular chambers. Between the large eyes the rostrum gradually emerged. . . . The umbilical vessels, issuing outwards, were lengthened, and produced through the yolk and albumen. The heart, shut up within the thorax, kept the following shape: With its two ventricles,—little contiguous sacks, as it were, and united together at the upper part,—it was joined to the body of the auricles lying above them; and there were two successive motions in the ventricles, and the same number in the auricles: for the tubular body, which, by its pulsation, propelled the blood received from the right ventricle, into the arteries continued therefrom, was drawn downwards, and formed a left ventricle larger in size. Around the two ventricles were gradually drawn spiral muscular fibres, of which the flesh of the heart was made up; and both ventricles were knitted together and enswathed. The auricles, themselves rendered uneven and corrugated in consequence of the interlacing of their muscular fibres, constituted a new little heart, as it were, with two distinct cavities,—which is more clearly evident in the full grown chick. . . .

(w) [“AFTER THE EIGHTH DAY of incubation, the chick meanwhile increasing in bulk, the head still retained its relatively large size, and on opening it the cerebral mass was found to be still more solid; for the hitherto separate vesicles were now united, and constituted two eminences, wherein were formed the ventricles, likewise the thalamus or origin of the optic nerves, and the cerebellum with the beginning of the medulla spinalis. . . . The heart pulsated, as usual, and at its sides, lungs of a white color came to view. . . .

(x) [“AFTER THE TWELFTH DAY the structure of the lungs came to view, the ribs being solidified, with the muscles spread over them externally.

(y) [“WHEN THE FOURTEENTH DAY HAD PASSED the chick was nearly perfected. . . . The heart, Fig. 23, B, was composed of united ventricles; and a number of arterial tubules, C, like the fingers of a hand, formerly separated from the heart, were now attached to it immediately. The auricles, D,

which were large and intensely red, were composed of a network of muscular fibres, in which were discerned areas and spaces of different colors" (pp. 59-63)].

175. 48. By the observations of this keen sighted author, it seems to be established that the blood proceeds by degrees, until it reaches its red or final composition; or, that it comes into existence by three degrees, and consists of three degrees, answering to the same number of degrees in the organic substances of the cerebrum,—according to which, moreover, the latter seems to be formed. That is to say, that the first degree of the blood is a most pure essence which is commonly called animal spirit; its second degree, the white blood, into which, according to the microscopical experience of LEEUWENHOEK, the red blood is resolved; and the third or last degree, the red blood; to say nothing of intermediate differences which produce colorings arising from a mixture of other liquors; to wit, when it appears of a yellow, rusty or pale red color. Moreover, in forming the cerebrum, the above mentioned sanguineous essences, distinguished from each other by degrees, perform their work successively; and this in agreement with the phenomena described by our author, so distinguished for his keen sight and ingenuity; to wit, that first of all comes a kind of stamen and production under the appearance of a carina surrounded by white zones; to which, in due order and time, vesicles apply themselves whereby a juice is milked from the albumen into the zones. Then, with the growth of the carina, comes the white blood made up principally of the prior spirituous blood; and finally the red blood, which at last pervades the cerebrum itself; at which time, the sinuses are formed, and a path of immediate communication with the heart is constructed for the forming and perfecting,—but still under the cerebrum's auspices—of the diminutive machine of the body; for thither does it transmit fibrillar and nervous substances.

176. It seems also worthy of observation, that the red blood appears in the cerebrum, and yet the latter, by means of its pia meninx, so disposes it and profers it to every single

part of its cortical substance, that at each turn of its circulation, it undergoes the same changes that it underwent in the course of its formation; that is to say, that it resolves itself from red blood into white, and from white into its primitive spirituous blood: which latter, with a new and similar blood, flows into the fibres and again compounds into white blood, and finally into red. Thus we perpetually subsist by the like means as those whereby we came into existence.

177. 49. The cerebrum therefore seems to undergo three signal changes of its state; for although a continual change is seen, still all the changes might be referred to three signal changes; to wit: A first, which must be called, not a change, but, rather, a conception, when blood of the first degree, that is, purely spirituous blood, flows in; a second, when white blood flows in; and a third, when red blood flows in, or when the cerebrum, using the word in a general sense, concurs with the heart for the formation of the series of its body.

178. 50. As to the determination of cerebrum's animatory motion in the first degree, this can hardly be followed up save by conjecture; for experience furnishes no evidence respecting it, except that a perpetual vibration is perceived in the zones. And since nothing is seen at this time save a certain slender production into the spine, whence emerges the figure of a carina* on which is imposed a little head; and, except the vesicles in the vertex and at the sides, there is as yet nothing outside the zones of integuments of the carina, whereby its constituent and nutrient essences are drawn in; we may be allowed to divine that the animation is then a general one, but greater in the vertex; and that by the alternations of this animation, little passages of the utmost subtilty are opened up into which is drawn blood of the highest purity.

*Carina is a Latin word meaning a keel.

(To be continued.)

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NOTES BY THE EDITOR.

We call attention to the announcement in this issue of the annual meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION. It will be recalled that at the last annual meeting, a resolution to hold the meeting for 1920 in New York in connection with the meetings of the General Convention, was referred to the Board of Directors. Acting on this matter, the Board has made arrangements to adjourn from the formal annual meeting, which will be held in Philadelphia on May 29, to a special meeting to be held in Brooklyn. (See the announcement on the last cover page.)

At this meeting will be read the President's address, entitled "A Primer of Swedenborg's Philosophy," and the following gentlemen have also offered to address the meeting: Professor Iungerich on "The Physiology of Primitive Man;" Mr. W. H. Howard on "Confirmations from Modern Science of Swedenborg's Philosophy in the Realm of Physics."

Owing to an unfortunate error, the last four pages of volume XXII were printed in the same form as the first pages of volume XXIII. As this makes it difficult to satisfactorily bind the volumes separately, as required by the Index, which covers volumes XX-XXII, we have had these four pages reprinted for inclusion in volume XXII, and they will be supplied to any of our readers who may desire them. The next index to be issued will cover volumes XXIII-XXV, and when these volumes come to be bound the binder should be instructed to cut out the four opening pages just referred to,

namely 453-456 of volume XXII, leaving a sufficiently wide margin to ensure the satisfactory stitching of pages 1 to 12, which are printed in the same form.

GUSTAF RETZIUS.

DR. GUSTAF RETZIUS, whose enthusiastic initiative and generous liberality, led to the publication of vols. I-III of Swedenborg's *Opera* by the ROYAL SWEDISH ACADEMY OF SCIENCES, was remarkable as being a man of the highest standing in the scientific world, and at the same time appreciative of the truly Christian spirit that characterizes Swedenborg's philosophical and scientific writings. Among the leaders of modern learning there are few indeed who will give favorable hearing to a philosophy, or a scientific analysis of phenomena, that is founded on the acknowledgment of the Love and Wisdom of God, and not on a materialistic conception of the universe, or a conception in which Divine Love and Wisdom is ignored if not denied.

It was no accident that led DR. RETZIUS to see something of the depth of learning contained in Swedenborg's writings, and to labor to the end that these writings might be given to the world in the stately dress of the Swedish Royal Academy! The quality of a man's perception and of his estimate of what is truly worthy, depends solely on the form of mind that he has built up by his life. A mind that rejects God and eternal life, or a mind that when philosophizing ignores Divine Law and the world of spiritual causes, can hardly see value in that which continually sets forth the wisdom of God, the harmony of His laws, and the concurrence of all things for eternal ends, and that points to the causes of things as existing in the spiritual world. Such was not the form of Dr. Retzius' mind, for with all his learning he cherished a belief in eternal life and in Ends Divine, that regard more than the material things around us.

That GUSTAF RETZIUS held Swedenborg's philosophy in high

value, as a signal and needed contribution to the growth of learning, we know. And though we may not know the exact estimate he placed on that philosophy, we may be sure that his marked appreciation had its secret spring in his belief in God and life eternal.

Such are the thoughts inspired in us by a short passage communicated by Mr. Alfred H. Stroh from a letter by Mrs. Retzius. As contributing to a more intimate view of DR. RETZIUS and some understanding of the source of his regard for Swedenborg's philosophy, we may be permitted to make this passage public:

"To me (writes Mrs. Retzius) it is a great comfort that Gustaf had a firm faith in *a life after this*; and his faith in immortality, and his longing for immortality, he has expressed in beautiful poems which I have found after his death, and which I hope will be printed and published together with the former (privately) published poems which he published for my seventieth birthday. Among them there are several which give expression to his longing for a better world. It is so important that they become known, for it is seldom that a great man of science believes in *a higher allwise order* and in an eternal life!"

PUBLICATIONS AVAILABLE, BUT LITTLE KNOWN.

In the summer of 1910, in connection with the Swedenborg Congress, and later in the same year in connection with the removal of Swedenborg's remains to the Cathedral of Upsala, there were published in the original texts a number of Swedenborg's earlier works which had previously been extremely rare and even absolutely unobtainable; but so little advertised were these valuable publications that few have more than a vague memory that there were such publications, and still fewer know and realize that they are actually on the market and for sale.

Now, so far as we are aware, outside of Sweden there was

no published announcement of their being for sale until such announcement was made in "The Classified List" published last year by the SWEDENBORG SCIENTIFIC ASSOCIATION. And yet it is a matter of importance that the existence of these books should be known to all students of Swedenborg. They were printed only in small editions, five hundred copies at the utmost, and it is easy to conceive that it will be but a few years before they will be obtainable only at second-hand book stores. Some of them had never before been published, while others, which were republished by Dr. Immanuel Tafel in the '40's are now all but unobtainable; nor is there any prospect that they will again be published in the original text for a great many years to come. It is for the purpose of calling the special attention of our readers to these unique publications that we have set them forth in a special advertisement on the last cover page of this issue of the NEW PHILOSOPHY; and that we now more particularly note their contents.

The OPERA POETICA, issued by the University of Upsala, contains all the poems known to have been written by Swedenborg. Previous to this publication the only extant collection of Swedenborg's poems was that contained in the LUDUS HELONICUS, or Carmina Miscellanea, published by Dr. Deleen, Stockholm, 1826, and republished by Dr. Immanuel Tafel in 1841. In the collection of poems contained in these editions were included not only the poems published by Swedenborg himself, under the title LUDUS HELONICUS, Gryphswald 1714, and republished with additions at Scara in 1716, but also some other poems published by the author at various times. All these are included in the present volume; but also much more; for since Deleen's editions, republished by Dr. Tafel, five other poems have been discovered and with the inclusion of these, the OPERA POETICA constitutes the first complete edition of Swedenborg's poetical writings. In this edition, moreover, the poems are published in fac-simile, and this gives an added charm to the volume.

For the most part these poems are written in Latin, a few of the shorter ones only being in Swedish. They include the earliest known lines by Emanuel Swedenborg, these being ten Swedish verses written by Swedenborg, at the precocious age of twelve years, in celebration of the marriage of two family friends. There are also two poems to the author's father, one of them—an ambitious piece of sixteen verses in Latin, to which is added the original Swedish text—which was written on the occasion when the author reached his majority; and the other, a short birthday poem written seven years later in celebration of his father's sixty-third birthday, and expressive of the most profound admiration for his father's character and the utmost degree of filial love. There are also long poems on mythological fables and in celebration of the great Swedish victory over the Danes, etc., besides a number of shorter pieces dedicated to Venus, the Graces, the Sciences, and even to the nobility of manual labor. We may add that the reader will find a most interesting account of Swedenborg, the poet, in a review of *LUDUS HELONICUS*, by Prof. E. S. Price, published in *New Church Life*, 1900, p. 580-88; and he will also find a complete translation of some of the shorter poems published by Dr. Frank Sewall in the *NEW PHILOSOPHY* for April, 1916, p. 209.

Another of the literary efforts of the young Swedenborg is the *SELECTAE SENTENTIAE*, published in fac-simile of the extremely rare original edition of 1709, by the Library of the Stockholm New Church Society. The work was reprinted in a second edition by Dr. Tafel in 1841, but quite apart from the value attaching to the fac-simile, this edition by no means compares with the present handsome volume. The *SELECTAE SENTENTIAE* is the Academical disputation which, according to the custom of the times, Emanuel Swedenborg wrote and defended, upon the occasion of finishing his studies at the University of Upsala at the age of 21 years. It consists of the proverbs or wise sayings of the philosopher Seneca and of the mime Publius Syrus, with a Greek version by Scaliger on the

opposite page, and a copious Latin commentary by Swedenborg, full of classical allusions, and giving evidence of a wide study of the writings of the ancients, and also of the Scriptures. In these comments, moreover, is sometimes observable the germs of those noble and enlightened thoughts which led to the formation of the great universal doctrines which so nobly distinguish Swedenborg's later philosophical writings.

The fac-simile is made from the copy used at the disputation itself, and it reproduces the manuscript note which gives the names of Swedenborg's "opponentes," and of the presiding officer at the disputation; this was Jesper Swedberg, who is described in the note as "pater."

Closely connected with Swedenborg's university days is also the *CONSTITUTIONES NATIONIS DALEKARLO-VESTMANNICAE*, Upsallae die X Maji, 1700 Datae, published by the Vestmanlands—Dala Nation of the University. This was the "Nation" (students club or fraternity) to which Swedenborg, as a student, belonged by virtue of his birthplace. In this work we have a reprint of the Constitution of the Nation, written in Latin, May, 1700, and signed "Jesperus Swedberg, Nationis Inspector." Then come notes on Swedenborg's studies while at the University, from 1699 to 1709, which were collected and published by the Nation in commemoration of the unveiling, in Upsala University, of the sarcophagus dedicated to the memory of their most illustrious member. Swedenborg's father, Bishop Swedberg, who naturally was also a member of the Nation, and who was its second "Inspector," seems to have been held in high esteem by his fellow members. For we are informed in this publication that at the formal entertainment given to Bishop Swedberg in 1703, when he resigned his position of professor at the University to become Bishop of Scara, the Nation presented him with two silver candlesticks accompanied by the most cordial addresses of felicitations and good will. In his letter of thanks, which is here printed in full, the Bishop takes occasion to encourage

the students to the study of English which he assures them has such similarity with the Swedish tongue that "it can easily be learned." He also does not forget to give them some wholesome counsel from Scripture.

Here also we learn that at his matriculation in the Nation on June 15th, 1696, when he was ten years old, Emanuel Swedenborg "was already a youth of unusual development who was glad to discuss theological questions with the clergy;" and in the *Album Studiosorum* he is described as "*optimae indolis*;" and, to note a minor but, to treasurers, a very comforting characteristic, it is furthermore recorded that he always paid his dues promptly.

The *CAMENA BOREA* is the publication by the London Swedenborg Society in commemoration of the removal of Swedenborg's remains to Upsala. It is a fac-simile of the rare original, a copy of which is preserved in the Royal Library at Stockholm. This work was published in 1715 when the author was twenty-seven years old, and was announced on the title page as being "by E. S., a Swede." This led to the book being catalogued in the Royal Library under "anonymous works;" but the true authorship was subsequently discovered, and it is noted in handwriting on the copy in the Royal Library, and of course duly reproduced in the phototyped copy, as "*Emanuelis Swedenborgio*," subsequently altered to "*Swedenborgio*." The *CAMENA BOREA* is a series of fables written after the manner of Ovid, in which the youthful author deals with contemporary political events; and the nature of his treatment can perhaps be surmised from the fact that he found it advisable to discuss political persons and events under the guise of fabulous characters and their doings.

The second publication from Upsala is the fac-simile edition of the first learned journal of Sweden, the *DAEDALUS HYPERBOREUS*. This journal was founded by the enthusiasm and industry of Emanuel Swedenborg, who thus gratified his longing for the elevation of learning in his native country. The

work was edited and, for the most part also written, by Swedenborg from 1716 to 1717 on his return from his first foreign journey, and was a work inspired by that longing for learning which had been so greatly stimulated by his contact with the learned world outside Sweden. The fac-simile is published by the Royal Society of Sciences of Upsala, and includes the early minutes and statutes of that Society, and of course a reproduction of the valuable plates of the *DAEDALUS HYPERBOREUS*. This work is written for the most part in Swedish, though there are some pages in Latin. It includes many articles on various scientific subjects by Swedenborg who was then first developing his mathematical and engineering talents. There are also descriptions of improvements and inventions in the domain of mathematics and machinery, especially mining machinery; the articles on machinery being fully illustrated by plates. In this work we find the first publication of Swedenborg's thoughts on the flying machine, in which he boldly declares the futility of seeking to find practical air traffic by balloons, and declares himself unequivocally in favor of planes, as being the nearest imitation to the method of nature revealed in the flight of birds. There are also articles on speaking trumpets, air pumps, hoisting machines, etc.; in fact, Swedenborg here gives full bent to that inventive genius of which he speaks in a letter to his uncle Benzilius in 1714, where he enumerates his various inventions which include a submarine, an air gun, a universal musical instrument, an auto-carriage (automobile), etc.

In the *DAEDALUS HYPERBOREUS* is also printed Swedenborg's first attempt to solve the problem of finding the longitude at sea. And in the last issue of the *Journal* we find a paper wherein Swedenborg tabulates a number of arguments to show that our vital force consists mostly of little vibrations, that is, tremulations. This was a forerunner of the larger work on *TREMULATION* which he wrote in 1719 and submitted to the Stockholm Sundhets Collegium (Board of Health) for examination. For the writing of this work he declares he had

made himself "thoroughly acquainted with the anatomy of the nerves." Both the forerunner in the *DAEDALUS*, and the work itself, are included in Prof. Odhner's English translation, entitled "On Tremulation."

Another festal publication by the Royal Society of Sciences of Upsala, though not a work by Swedenborg, deserves mention here on account of its extreme interest. The work is written in English, and entitled *THE MORTAL REMAINS OF EMANUEL SWEDENBORG*, being an account of the historical and anatomical investigations conducted by a committee appointed on May 17th, 1908, by the Royal Academy of Sciences, Upsala. It was published in commemoration of the removal of Swedenborg's mortal remains from the Swedish church in London to the Cathedral of Upsala, where they now lie in a noble sarcophagus erected by the Swedish Parliament. The work, while being a complete history of Swedenborg's remains, is more especially directed to investigating the question whether the skull found in the coffin in 1910 is truly the original skull, or is another substituted in its place. In this investigation are included thrilling narratives of the first surreptitious opening of the coffin in 1790, in order to satisfy the absurd pretensions of "a foreign gentleman" who claimed that Swedenborg had discovered the elixir of life and that his funeral was a mere sham. Then comes the equally thrilling account of the theft of the skull twenty-five years later by a Lieutenant of the Swedish Navy, and of his attempt to sell it to members of the New Church. The New Church men, however, sternly rejected the offer, and took the occasion to point out to the Swedish lieutenant that they were not worshippers of relics. And so the story runs on to the time when the skull found its way into the phrenological collection owned by Mr. Chas. A Tulk, M. P., where it was examined by the sculptor Flaxman, whose interesting report concerning it is quoted; and how finally it was restored to its original receptacle. Then comes an interesting and detailed account of the opening of the coffin in 1910 preparatory to removing the remains to Sweden, and

the various and ingenious tests which were subsequently made to determine the genuineness of the skull found therein. Pains-taking, indeed, and laborious was the work done in this investigation. A cast of the skull was made, and on this as a basis, proceeding according to statistical craniological data, was formed a cast of the head; and finally an artist, with a painting of Swedenborg before him, made from this cast a complete bust.

The story throughout is of absorbing interest and is well and fully illustrated by pictures of the London Church, Upsala Cathedral and the Sarcophagus therein, the coffin, both closed and open, the latter showing the remains in situ, besides several portraits of Swedenborg, both genuine and doubtful, of the skull itself, of the cast, and of the various processes leading to the completed bust.

To this work the Royal Society of Sciences of Upsala added, in 1912, a supplement or *ADDITIONAL NOTE*, wherein Prof. Hultkrantz examines and finally disposes of a claim made in a letter from England received after the publication of the first work, that Swedenborg's skull is still in England at the shop of an old herbalist.

As his contribution of the Festal Publications in connection with the Swedenborg Congress, Mr. Alfred Stroh issued a reprint of the fac-simile of the *FESTIVUS APPLAUSUS IN CAROLI XII ADVENTUM*, printed by Mr. Stroh in 1908. Until 1905 the very existence of this work was entirely unknown, but in that year Mr. Stroh found two copies in the Library at Greifswald, where it had been published by Swedenborg in 1714 on his journey home from his first foreign travels. Even now, these two copies, so far as we know, are the only copies of the existence of which we have any record. Subsequently to Mr. Stroh's discovery, one of the Greifswald copies was presented to the Royal Academy of Sciences, and it is from this copy that the present fac-simile has been printed.

The work was written by Swedenborg when he was twenty-six years of age. It is a laudation of Charles XII on his return from his Turkish captivity. Opening with a poetical description of the doctrine of the transmigration of souls, in the deeds of Charles XII are traced the heroic work of the ancient heroes of Greece, now revived in their glory. His escape from Turkey is described in heroic strains as the yearning of a patriot for his native land and of a father for his children. Of the Swedish people, the author speaks in poetic vein how that those who were infants when Charles left, are now grown up, ready to follow his banners and set their breasts against his enemies; how that, though the land is changed, though the old have become feeble, and now lean on their staves, "though the people that venerate thee be another people, though all be wornout, yet when they shall hear that thou hast returned they will again take breath and new life. All things shall now be vernal, and winter shall depart. The earth shall bid her flowers to bloom again and again to shed gladness over the land."

As may be imagined, the work is written in a highly poetic vein; and the style of its language is fully commensurate with the richness of its imagery. It is written in a Latin remarkable for its Ciceronian purity, and the more remarkable, when we consider the age of the author; a Latin which not only gives evidence of that richness of vocabulary which is so manifest in Swedenborg's later, and especially in his theological works, but especially of that beauty of diction, of which Swedenborg was a master, but which he used for the last time in the writing of *THE WORSHIP AND LOVE OF GOD*. For all his subsequent writings were in that plain and simple style so familiar to the Latin students of Swedenborg's theology. It is on the basis of the style of these later writings that superficial critics have affected to sneer at Swedenborg's Latinity; their sneers are evidence only of their own ignorance.

We might also mention in this connection the *CATALOGUS*

BIBLIOTHECAE, which was printed and published by Mr. Stroh in Stockholm in 1907. This little pamphlet of sixteen pages is a fac-simile reprint of the original AUCTION CATALOGUE whose translated Swedish title reads, "A list of the fine collection of books left behind by the deceased, the well-born Assessor Swedenborg, in various languages and sciences, which will be sold in the Book-Auction Chamber in Stockholm, November 28th, 1772." This Catalogue is another of the discoveries made by Mr. Stroh, who found it in 1907 among a collection of Auction Catalogues for 1772 to 1773, which were stored away in the Royal Library at Stockholm.

The Catalogue is divided into two parts, Pt. 1 containing over 365 titles of books in Swedenborg's own library, and Pt. 2 consisting of two appendices, evidently listing works added by the auctioneer. This Catalogue is of the utmost value to the librarian and bibliographer, for the determination of the literature used by Swedenborg and referred to in his writings. In the Library of the Academy of the New Church it has been made the basis for a special, and now extensive, collection of scientific works of Swedenborg's period, and especially of the works contained in his Library, or which were otherwise known to have been used by him.

Of a quite different nature than the preceding works, is the Festal Publication of the New Church Bokforlaget. This consists of a phototyped reproduction of three Swedenborg manuscripts. The work is entitled SWEDENBORGIANA, PARS I. It is the first part of a work planned some years previously "to contain phototyped reproductions of the Scientific works, and documents illustrating Swedenborg's life."

The volume contains three works, all in Swedish. The first is a "Discourse between Mechanica and Chymia, on the Essence of Nature." Although this discourse is clearly written by Swedenborg's hand, there are several evidences which tend

to show that it is not a composition by Swedenborg. The second work in the volume is "A new arithmetic in which 8 is used as a basis instead of the usual number 10." This work was a development of a suggestion made to Swedenborg by Charles XII, who pointed out that by using ten as the basis of our numbers, difficulties were encountered by reason of fractions, which would be entirely obviated if a number were used, the square root of which could be taken without fractions. On the basis of this suggestion Swedenborg prepared a plan of numerals based on 8; and he submitted a sketch of this plan to Charles in person. It is doubtless on the basis of this sketch that the present manuscript was written. The third reproduced manuscript is a first draft of Swedenborg's theory concerning the "Motion and Rest of the Earth and Planets,"—being an attempt to show that the earth rotates more and more slowly, and that the years will "become longer and longer until the last time of the world."

The first two of the above manuscripts are preserved in the Royal Library of Stockholm and the other is in the possession of Jarl Ernberg, Esq., of Stockholm. The phototyped reproduction has been purchased by the Academy of the New Church, and will doubtless be available for purchase by the public.

The Royal Swedish Academy of Stockholm has contributed a most valuable item to this interesting series of Festal Publications; this contribution being the publication, from the original manuscripts, now in the Royal Academy Library, of Swedenborg's *JOURNALS OF TRAVELS*. These works have never before been printed in the original text, though Dr. Rudolph Tafel included a translation of them in the second volume of his "Documents concerning Swedenborg." The first journal, which consists of only two pages, is a brief outline of travels made in 1710, 1721 and 1733. Then follows the main journal, written entirely in Latin, and containing a detailed account of the author's journeys in the years 1733-4. The third Journal, written in Swedish, is a diary of his travels during the years

1736-1739. As might be expected from the pen of a man so well informed and with a mind so active as Emanuel Swedenborg, these journals are of surpassing interest, and show, both the wide range of Swedenborg's knowledge, and his enthusiastic interest in all that came before his notice. Of especial interest in these pages are his notes of scientific observations, especially with regard to mineralogy and metallurgy, which were at that time very active subjects of study with Swedenborg in connection with his *Opera Mineralogica*, to say nothing of his official position as an assessor of the Swedish College of Mines.

In concluding this list of Festal Publications, we wish to refer to one more of the rarities which have been published in Sweden, (though not as a Festal Publication), but which yet are almost unknown to the New Church public, namely, the reprint of Swedenborg's *ALMANAC FOR 1752*. This little work was discovered by Mr. Stroh in 1903, among a mass of old Almanacs in the Royal Library of Stockholm. It contains a note, in the writing of a former librarian, to the effect that the work had been presented to the library by a merchant who had purchased the book for over \$60.

It was a custom of the Universities to issue almanacs year by year, many of them being interleaved for the entry of notes. They were very small books which could easily be slipped into the vest pocket. It was an interleaved copy that was discovered by Mr. Stroh, the interleaves being filled with notes in the handwriting of Swedenborg, and it is these notes that were gathered together by Mr. Stroh and printed in a little volume of the same size as the original manuscript.

For the most part the notes consist of records of the dates on which the manuscript leaves of the *Arcana Celestia* were sent from Stockholm to the London printer. Thus on January 3rd, Swedenborg notes that he sent "to John Lewis pages 205-

208, No. 4700, ending with the words *Ecclesia, non autem apud illos (qui) ;*" on January 7th he sent pages 209-12 ; on the 10th, pages 213-16, and so forth. The ALMANAC is of value as determining the dates on which the parts of the Arcana were written.

In addition to these notes on the progress of the printing of the Arcana, Swedenborg also entered in this little ALMANAC numerous jottings respecting the sowing of flower seeds in boxes during the winter, together with his plans for setting out flowers and vegetables in the different parts of his garden. As remarked by a reviewer of this little reprint, the work "suggests a pleasing picture of the Revelator working day by day in his mission, taking recreation only among the beloved flowers of his beautiful garden."

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS

BY

EMANUEL SWEDENBORG.

On the soul of Eve. [If it is asserted that woman was not taken from man, but like him received a soul made by God, inasmuch as God made individual souls for each of them, the soul of the woman was not made as one of the first works.] Or if a general rule was made for all souls, as there is a rule in the begetting of men, then we come back to the hard and troublesome position, of declaring the daughters of men to be the souls, either of angels, or, what is most unworthy, of the corporeal heaven, or of some even lower element. And thus it remains to see,—and if the truth is hidden we can at any rate put forth the probability,—whether the thing was done in the way I have mentioned or whether in the first works of God, the one soul of the first man was made, from the propagation whereof were to be created all the souls of men; or whether new souls were made subsequently, not one of which, or no rule of which, had preceded in the works of God made on the first six days.

First of all let us firmly hold, that the nature of the soul cannot be converted into the nature of the body, so that what was once soul can become body; nor into the nature of an irrational soul, so that what was a man's soul can become the soul of a brute animal; nor into the nature of God, so that what was a soul can become what is God. And so, on the other hand, neither can a body, nor an irrational soul, nor substance, which is God, be converted into or become a human soul. For it should be nowise uncertain that the soul is nought but a creature of God. [If, therefore, God made man's soul neither from the body, nor from an irrational soul, nor from himself, it remains either that he made it from

nothing, or that he made it from some spiritual (*spiritali*) but yet rational, creature.] But to desire to show that something was created from nothing, after all the works had been finished whereby he created all things together, would be rashness; and whether this conclusion can be reached from evident proofs, I know not. . . . In matters of this kind, therefore, it is safer not to deal with human conjectures but to search well into the Divine testimonies.

Thus the position that God created souls from angels as parents, comes to me as being without any authority from the canonical books. Still less then did he create them from the corporeal elements of the world,—unless, perhaps, we are influenced by the passage in the Prophet Ezekiel, chap. xxxvii: ["And the Lord said unto me: Prophecy unto the spirit,* Prophecy, Son of man, and say to the wind, Thus saith the Lord God; Come from the four parts of the winds of heaven, and breathe upon these slain that they may live. And I prophesied as the Lord commanded me, and the spirit of life entered into them and they revived and stood up upon their feet, an exceeding great army." v. 9, 10.] (*De Gen. ad Lit. Lib. X, cap. [iii] iv, v, [III, 228G, 229C.].*)

TERTULLIAN believed the soul to be body, and this for no other reason than that he could not think of it as incorporeal, and therefore was afraid it would be nothing if it were not body. [Nor was he able to conceive of God in any other way. But, being an acute man, when the truth appeared, he was sometimes conquered even against his own opinion.] For how could he speak more truly than where in a certain passage, he declares that everything corporeal is capable of suffering? etc. (*De Genes. ad Lit. Lib. X, cap. xxv [III, 234C.].*)

The soul retains its rational without the flesh. . . . By its rationality it is capable of being enlightened for the knowledge of what is below itself, and above itself, within itself, and by the side of itself. Thus it learns of God above itself, [and of itself within itself] and of the angels by the side of

*A. V. "wind."

itself, and of everything that is contained in the circuit of heaven below itself. (*De Spir. et Anima*, cap iv [III, 358G].)

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It is said sense, imagination, reason, intellect, intelligence; and all these in the soul are nothing else than the soul herself. With respect to each other, and for the sake of various exercises, they are of one property or another, but they are one essence of reason and one soul. The properties are, indeed, diverse but the essence is one. In respect to exercise they are many, but in respect to essence they are one in the soul and are the same as the soul. . . There are five progressions to wisdom, namely sense, imagination, reason, intellect, and intelligence (*De Spirit et Anima*, Cap. iv: [III, 358H]).

The soul being made after the likeness of the whole of wisdom carries in herself the likeness of all things (the representation of the universe*), etc.† . . . She is like to stones by essence, to trees by life, to animals by sense and imagination, to men by reason, to angels by intellect, to God by intelligence (*De Spir. et Anima*, cap. v & vi [III, 359B]).

The soul is capable of all things; for by rationality she is found capable of knowing the universe, and by desire, of loving it. . . . But the faculties and instruments, as it were, for knowing and loving, are her possession by nature, while the knowledge of truth and the order of love can never be her possession except by grace (*De Spir. et Anima*, cap. vii, [III, 359D]).

The soul and the spirit in man are the same, although spirit means one thing, and soul another. For spirit is predicated of substance, and soul of vivification. The essence is the same.

*The words in parentheses are Swedenborg's comment.

†"Therefore she is defined by the Philosopher as the likeness of all things [Aristotle, *De Anima*, III, 8]. For she has in herself forces whereby she apprehends or

investigates all things and is like to all, since she is one. She is like to earth by sense, to water by imagination, to air by reason, to the firmament by intellect, to the heaven of heavens by intelligence. She is like to stones," etc.

but the property is different. For the one and the same spirit is called spirit in respect to itself, and soul in respect to the body. It is spirit, in that it is rational substance endowed with reason; it is soul, in that it is the life of the body. . . . The human soul, since it has its being both in the body and outside the body, may indeed likewise be called soul and spirit. There are not two souls, a sensual and a rational,—one whereby man lives, and the other whereby he is wise; but one and the same soul lives in herself by the intellect, and gives life to the body by sense. . . . The life of the soul is indeed twofold, one whereby she lives in the flesh, and the other whereby she lives in God. Therefore there are in man two senses, one interior, the other exterior; and each has its own good wherein it is refreshed (*De Spir. et Anima*. cap. ix; [III, 359F]).

The spirit is called the soul, whether of man or of beast. The spirit is called the rational mind, where there is a spark like the eye of the soul; to which mind belongs imagination and the knowledge of God. The eye of the soul is the mind pure of every bodily failing; the sight of the mind is reason; that of the intellect, vision. . . . The spirit of the mind is nothing else than the mind, just as the body of the flesh is nothing else than flesh (*De Spir. et Anima*, cap. x; [III, 359G, 360A]).

Every soul is spirit, but not every spirit is soul. The actions of the soul are twofold; for by one counsel the soul is lifted up to God, by the other she is turned to the flesh. . . . The whole essence of the soul consists in these her powers. Nor is she divided by parts since she is simple and indivisible; and if she is said to have any parts, this expression must be understood by way of comparison rather than as arising from any actuality of composition. . . . The whole substance of the soul consists in rationality, concupiscibility, and irascibility as in its own peculiar trinity; and this whole trinity is the unity of the soul, and is the soul herself. God is all His own properties; the soul is only some of her properties. . . . She has accidents, and herself

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is not an accident. She is her own forces, but not her virtues.*

The soul is conjoined with the body by certain affections and in a certain friendship. . . . She loves her prison house and therefore cannot be free (*De Spir. et Anima*, cap. xiii, xiv, [III 360GH, 361A]).

The composition of the body is effected as follows: The body consists of serviceable members; these members of like parts; the like parts of humors; the humors of foods; the foods of elements. And not one of these consists of the soul, but the soul acts in them as in organs, and she thereby consults the good of the body and of that life wherein man is made a living soul. And when these have been tempered and ordained, they are in accord with the vivification, and the soul never recedes; but if they are distempered and confused the soul unwillingly recedes [taking with her all sense, imagination, reason, etc.] (*De Spir. et Anima*. C. xiv, [III, 361F]).

In respect to the incorporeal God, the soul is corporeal; for nothing can be believed to be invisible and incorporeal by nature excepting God only.† He is called incorporeal and invisible from the fact that He is infinite and uncircumscribed and simple, and in Himself and as Himself, is in all ways sufficient unto Himself. But every rational creature is corporeal. Angels and all virtues are corporeal, although they do not live in the flesh. For we say that intellectual natures are corporeal from the fact that they must be circumscribed by space; as is the case with the human soul, which is closed about by the flesh, and which therefore can be said to be in space and to be spatial,—in place, because she is present here and elsewhere, and spatial, because what is wholly present in some place cannot be anywhere else. . . . The whole soul is simultaneously

*“For she is not her own prudence, temperance, fortitude, justice. The powers of the soul are rationality, concupiscibility, irascibility. Her forces are sense, imagination, reason, memory, intel-

lect, intelligence. But her powers can be called forces, and her forces, powers.”

†Augustine here adds “that is, the Father, Son and Holy Spirit.”

present throughout all the parts of the body; nor is she less in the smaller parts or greater in the larger. But, more intensely in one place, more laxly in another, the soul is wholly present in all the parts, and wholly present in each single part. For as the whole of God is everywhere present in the world and in each of His creatures, so the whole of the soul is everywhere present in the whole of her body, as in a world of her own,—though more intensely in the heart and brain; just as God is said to be especially present in heaven. . . .

The whole soul sees, the whole soul remembers the things seen; the whole soul hears, smells, tastes, and discerns; the whole soul wills, thinks, loves; she can also think in the part and love in the part (*De Spir. et Anima*. C. xviii, xix [III, 362CD]).

If God had made the soul from his own self it would never be vicious, or mutable or unhappy; and if it had been made from elements it would be corporeal. Since it is incorporeal, having an unknown origin it has a beginning but no end; and since it is of the nature of spirit it has nothing earthly commingled and concreted with it, nothing humid, or airy, or fiery (*De Spir. et Anima*. C. xxiv. [III, 363C]).

When I say mind, I mean nothing else than the soul; but I call it mind for one reason, and soul for another. The whole of that which lives is the soul of man. But when the soul actuates itself in itself, and from itself, and through itself, it is commonly called mind only; while sensation, for the fulfilling of the soul's offices is more commonly called the soul (*De Spir. et Anima*. C. xxxiv [III, 365C]).

We say that the animus is the same as the soul, but soul pertains to life, while animus pertains to counsel. Therefore the philosophers say, both that life remains in the absence of the animus, and that the soul endures in the absence of the mind, as in the case of the insane. . . . It is not the soul that is called mind, but that in the soul which excels, like the head or eye, as it were. . . . The mind is so called from the fact that it is eminent in the soul, being that more excellent force of the soul from which proceeds intelligence. Reason is the motion of the animus (*ibid.*. C. xxxiv [III, 365D]).

The life of the body is the soul; the life of the soul is God. The soul is immortal because it is without flesh; nor does it have any place where it may fall, etc.* (*ibid.*, xliii, [II, 367G]).

The human animus,—set, as it were, in the middle,—[by a certain excellence of its condition, is superior to the mutability beneath it, and has not yet attained that true immutability which is with God]. But if by cupidity it immerses itself in those concerns that pass downward, then straightway it will be seized by infinite distractions, and, being in a manner divided against itself, will be dissipated. [Page 12]

But if it elevates itself above the infinite distraction which tends downward; and, leaving these lower concerns, and little by little gathering itself together, learns to be with itself, then it will be the more gathered together, in the degree that it is lifted up in thought and desire; until at last it becomes altogether immutable, etc. (*De Spir. et Anima*. C. xlvii [III, 368F]).

It is from truth that every soul has the quality of being wholly soul. But the soul is one thing, truth is another; for truth never suffers falsity, while the soul is frequently deceived. Therefore when the soul is absent from truth, it is not absent from itself. Truth is God; therefore, for the soul to be soul, it must have God as its author (*Octoginta tres Quaestiones*, Q. i [IV, 205A]).

The soul is denied the ability of beholding ideas, except the rational soul, on that side of her, where she excels; that is, by the mind and reason, as by a certain countenance, or as by her interior and intellectual eye (*Octogint. Quaest.* Q. xlv [IV, 210F]).

The rational soul when pure, is nearer to God than all created things; and so far as it cleaves to Him in charity, so far, being in a way suffused by Him and enlightened with that

*The passage continues "so as to need resurrection after the ruin,—unless it has fallen by sin. Therefore, in death our life does not perish, but it leaves the body."

intellectual light, it discerns,—not by the corporeal eyes but by its own principle wherein it excels, that is, by its own intelligence,—those reasons by the vision whereof it is most highly blessed (*Octogint. Quaest. Q. xlvi* [IV, 210H]).

Since it must be believed that angelic bodies such as we hope to have, are most exceeding lucid and ethereal; and since many emotions of our animus are now recognized in our eyes; it is probable that no emotion of the animus will lie concealed when the whole body is ethereal, in comparison with which these eyes are mere flesh (*Octogint. Quaest. Q. xlvii*, [IV, 211A]).

That the souls of the dead are not sensible of the affairs of the living* (*De Cura pro Mortuis gerenda*, C. xiii to xvii; [IV, 259C seq.]).

By the words *God breathed into his face the breath of life and man became a living soul*, some understand, not that a soul was then first given to man, but that the soul which was already in him was then quickened by the Holy Spirit. They are led to this conclusion by the fact that the Lord Jesus [after He had risen from the dead] breathed on His disciples saying, *Receive ye the Holy Spirit*. [From this they suppose that the same was done here as had been done before; as though the Evangelist had gone on to say "and they became a living soul." But if this had been said] we would understand it as meaning that the Spirit of God is a certain life of souls, without which rational souls must be accounted dead, even though, by their presence, their bodies seem to live. . . . God said, *Let the earth bring forth the living soul. All that have the spirit of life perished in the flood*† (*De Civitate Dei*, L. XII, Cap xxiv; [V, 145F, 146E. 1 City of God, 551 554-5]).

*These words are the title—printed in the margin—of Cap. xiii. Ch. xiv is entitled "An objection to the above."

†The latter part of this citation is the continuation of a long argument against those who affirm

that by God's breathing on man the breath of life, is meant not the giving of a soul, but the quickening of the soul already in him. "What great effort would it have required of them (he says) not to go further, but merely to read a

A comparison of natural light with the light of the mind, and of the soul; and with the lumen of God. (See *De Duabus Animabus contra Manichaeos* [Cap. ii-v; VI, 53 seq.]).

Nor is it the same as with man when he breathes;† he cannot take his breath from nothing, but what he takes from the air, that same he gives back. Thus we would have to believe that around God, had been diffused certain auras; of which He drew in some small portion by inspiration, and then poured it back by respiration, when He breathed into the face of man and in this way made him a living soul; and if this were the case, then what He breathed could not have been from Himself, but from some subjacent breathable thing. But far be it from us to deny that the Almighty could have made from nothing the breath of life whereby man became a living soul; and to be forced into such straits, that either we must hold the opinion that there was already something which was not Himself, from which He made the breath; or must believe that what we see to have become mutable was made from Himself. For what is from Him, is necessarily of a nature the same as His own; and thus it also becomes immutable; but the soul, as all allow, is mutable. Therefore it was not from Him, because it is not, like Him, immutable. But if it was made from no other thing, then without doubt it was made from nothing,—but by Him (*De Anima. et ejus Origine* L. I], C. iv, [VII, 427H, 428A. 2 Tnti Pelagian Writings, 210-1.]).

In many passages in the Scriptures a distinction is made between soul and spirit† (*ibid.* [Lib. I, Cap. xiv seq., VII, 430

little above in the same book. *Let the earth bring forth the living soul*; when all terrestrial animals were created. And further on, but still in the same book, what great effort would it have required of them to note the Scripture: *And all that have the spirit of life, and every one which was upon the dry land died*, which words involve that all creatures

that lived upon the earth perished by the flood?

*Augustine is here refuting the position that the soul was made from God, and not from nothing, or from any created thing. He holds that it was made from nothing.

†Augustine lays stress on the distinction between *spirit* (*πνεῦμα*) and Soul (*ψυχή*)

seq.; L. IV, C. xxi, xxiii, VII, 449, 450]). According to my theory, they should be distinguished.

[For continuation, see] p. 81.

—the Greek word frequently used by the LXX to represent the Hebrew word for Soul; Augustine read the LXX, not the Hebrew. He defines the soul as the whole life of animated creatures; but the spirit, he says, is "the rational and intellectual faculty" (*Anim. et ejus Orig.* I xxii) "whereby the soul exercises sense and intelligence; not indeed the sensation which is exercised by the bodily senses, but the operation of that inmost sense from which arises the term *sententia* (sentiment, opinion). It is owing to this that we are set above the brutes, in that they are devoid of reason. Therefore brutes have no spirit, i. e., intellect and a sense of reason and wisdom, but only soul. For it is of them that it is said, *Let the waters bring forth the creeping things of living souls, and let the earth bring forth the living soul* (*ib.* xxiii, 2 Ant. Pelag. Writings, 334, 336).

In support of these definitions, Augustine adduces many Scripture passages among which we quote the following: *The Lord who giveth breath (soul) to the people upon the earth, and spirit to them that walk over it* (Is. 42⁵)—where he holds, the reference is to man's

formation in the womb, and then to his reformation when he "walks over the earth." *My spirit shall go forth from me, and I have made all breath* (Is. 57¹⁶),—again referring to reformation, and creation in the womb (*ib.*, L. 1, C. xiv; 2 Ant. P. W. 227).

The same argument is maintained by Augustine in the passage in THE CITY OF GOD, cited in part by Swedenborg (P. —), where he quotes from Paul, *The first man, Adam, was made a living soul (anima), the last Adam, a quickening spirit (spiritus). But it is not the first that is spiritual but animal; while the last is spiritual. The first man is of the earth earthy, the second man is of heaven heavenly* (1 Cor. 15⁴⁵⁻⁷) Civ. Dei, L. xiii, C. xxiv *ad fin.* 1 City of God, 556).

Augustine maintains that in all these passages Soul means creative life, and Spirit the spirit of wisdom which the Lord breathed on His disciples. The soul, he says, cannot die since it is immortal—but the soul of the wicked "may yet be said to die because it has lost that life which is the spirit of God whereby it was enabled to live wisely and blessedly" (*ib.*).

(To be continued.)

THE BRAIN.

BY EMANUEL SWEDENBORG.

179. 51. But when, in the process of growth, this little mass, surrounded by its tiny wombs, acquires power, and is able to derive to itself blood of the second degree, it seems to undergo a signal change. For the vesicles are then seen to be transposed and multiplied, and to change their figure and consistency; the zones in the vertex to be expanded; a passage for liquor to be opened to the interiors, and perhaps to the underlying medulla, that is, the medulla oblongata and its beginnings; the follicle of the occiput to increase in size; the rudiment of the cerebellum to appear, which the cerebrum seems then desirous of receiving as a companion in the work; soon also is seen the first rudiment or trace of the heart, into which, however, no red blood as yet flows. Worthy of note, is the circumstance, that, in respect to their origin and growth, the cerebellum, the two medullas,—oblongata and spinalis,—and the heart seem to progress with equal pace,—perhaps to the end that, when the cerebrum invites to itself the red blood, it may enjoin on these organs the care of the heart and body. At this time the determination of the animatory motion of the cerebrum seems to be towards the subjacent parts, and, by their medium, towards the delicate little heart; and the cerebrum seems then to pour into the latter, principally white blood, or blood of the second degree; just as afterwards it pours white blood into the red blood itself; for although the umbilical varicose vessels come to view, they do not as yet draw near.

180. 52. The last change of state seems to arise when the heart admits red blood from the umbilical vessels or placenta; but this blood is not yet admitted into the cerebrum, which latter continues longer in a state of integrity. Finally the vesicle in the crest is divided into two; the intermediate portion is depressed; the cerebrum is divided into two hemispheres by the process of the falx, a sinus is interposed be-

tween them; and the supereminent vesicle is distinguished by a rivulet of red blood [n. 172 s, u]. After this, the motion of the animation seems to be determined thitherwards; for by these fissures, every opportunity is afforded for determining itself in this direction. At the same time, it then opens the ventricles, traces out the infundibulum, and constructs the organs and vessels of its chemical laboratory, in order that, by this path, it may be able to continually pour its purer essences into the new blood [173, v, w]. While it continues in the work of formation; the venous blood appears to be whiter and more dilated than the arterial; the heart to be extremely lively; and its auricle and ventricle to move with a double pulse. For, according to our distinguished author, "there were two successive motions in the ventricles, and the same number in the auricles" [n. 174, v]—inasmuch as the one was excited by the blood flowing from the brains and the two medullas into the superior vena cava, and the other by the blood flowing from the whole body into the inferior cava. Lastly, that all the blood which, after birth, will pass through the lungs, in the embryo passes through the cerebrum, using the term in a broad sense, may be seen in Trans. —, n. —.* Hence the origin of the double pulsation; for if it is effected by a circle of the kind described, then the blood of the cerebrum comes into the auricle before that of the body.

181. From the above it is also clear to some extent, that in the system when formed, the cerebrum always retains the common modes of its operation, which it had in the state of formation; to wit, that it transmits to the subjacent parts a nourishing juice; that it continually institutes the vibration of the heart by the transmission of blood; and vivifies the whole kingdom by its own animation and presence.

*Cf. 1 *Econ. of Anim. Kingdom*, 340, though this is not the reference intended by the author, since the *ECONOMY* was written after the present work, of which, indeed, it is in many re-

spects the finished draft. Perhaps the author intended to refer to that "Transaction on the Arteries of the Brain and Body," which he mentioned in n. 27 above, see n. 168.

182. 53. From all the phenomena it follows as an established conclusion, that the cerebrum undergoes signal changes before it brings this its work to the final goal; that these changes, mutually following each other, flow from laws of nature of the utmost constancy; and that there is no simple expansion of the parts and members, but a successive production; inasmuch as there exists first a kind of stamen with its little head, then the cerebellum, the medulla of the spine, the heart, and, later, the lungs and the other members in their order. Moreover, in its beginning, the heart itself does not exist such as it is in its progress. Even after birth changes follow, which are most constant according to age.

183. It is worthy of observation that, to the end that all those things that are successively derived into actuality may pre-exist in conatus; or, to the end that all the vital substances may have one mind (*animus*) and one will, because one soul; therefore the vessels, membranes and blood are terminated in that same substance where every fibre and nerve begins; that so the last of the one may be that which is the first of the other. Hence from an act everything comes to a conatus like the act, and then from the conatus goes into a like act. For nothing can exist in motion as an essential, which is not in like manner a conatus. That all things can be thus most perfectly inscribed on these first substantiate entities, is clear from the contemplation of memory alone, which, in the organs of the first degree, indefinitely exceeds in power, its like analogue in the second and third degree.

CHAPTER II.

The first twenty-two paragraphs, nos. 54-74, of this chapter, contain extracts from the anatomists on the subject of the dura mater.

205. 75. The cerebrum, enswathed in so many membranes, and finally covered by a bony vault, is less evident to the eyes of the investigator than any other viscus in the body. Hence

we cannot know by living experience what is the operation of its last or dura meninx ; nor what is signified by the connection, frequently tenacious, of this membrane with the cranium ; or by the varying directions of its fibres with their lacertous bonds, and occasionally with a granular congeries of glands. The solid bone forbids us from looking within. Therefore, reason must be consulted, and this must judge from forms and the connection of things. But when we have experience,—as a torch in dark places, and a guiding thread close held by the hand,—then only may we be allowed to commit ourselves to this blind cavity and winding labyrinth. For we know no more than what we detect by the eye ; and we extend our knowledges only so far as the understanding can lead on from this point by a continual connection. If previous experience does not bestow its favoring nod at every step, the mind, even though highly rational, may easily deviate from the path ; and if this happens, at the very threshold, where the mind seeks to enter upon the knowledges of things, it will extend its wanderings to whole circles of errors, until there is no longer any hope of return to the right path. This is the reason why I have quoted the observations of the anatomists at such length, and have adopted the policy of keeping to their own words ; that in the analysis of reasons, I may not be without sources of help ready to come forward at every step.

206. 76. If the origin of the animation of the cerebrum lies in each part of the cortical substance, it follows, that with a knowledge of the quantity and general quality of the latter, that is to say, of its conformation and direction, and of the space that it occupies, we can plainly infer as to the mode in which its cerebrum, or compound, elevates and compresses itself.

207. 77. It is well known that the human cerebrum is superficially discriminated into furrows or ridges, like winding hollows and spirals ; that the furrows run right and left, or bend and wind their connections and tortuosities from terminus to terminus, marvelously continuing their course from the anterior surface to the superior ; likewise that under each ridge,

insinuated to a greater or lesser depth, is lodged the substance of the cortex; that the sides of the ridges and the interstices between them, are everywhere pitted, and that the resultant little spaces and diversiform beds, are likewise occupied by cortex, somewhat deeply immersed; that the processes of the pia mater also turn inwards in a serpentine manner; besides many other particulars which the eye has not yet brought to open day.

208. From the above we induce in general: 1. That when the individual spherules constrict, they contract the whole of the ridge woven up of them, in its every extension from one extremity to the other, wherésoever it bends and unbends. 2. That the intervening and somewhat elevated furrows are smoothed down. For when the ridge contracts in its lengthwise extension, it contracts also its other dimension, that is, breadthwise. The cortex, somewhat deeply insinuated, being contracted in its little spaces and beds, attracts the serpentine windings of the processes of its meninx, and changes them from a curved and reflexed figure into one that is straighter. Hence from within, there is furnished an opportunity of elevating the furrows, and of somewhat smoothing them,—as mentioned above. 3. Hence results a unanimous and simultaneous effect of all these operations upon the whole surface; so that the cerebrum, with its ridges running into each other in both their dimensions, in its extremities and also in the great furrows which lie between the hemispheres and lobes, draws itself in, and, with itself, it draws everything that is attached and appended to its ridges. Consequently: 4. That in its state of contraction, it draws in all the sinuses, arteries and veins from every side, and brings their extremities to a smaller extension; and thus opens and expands them in both their dimensions. And, on the other hand, in its state of expansion, it contracts, extends and closes them. These phenomena will be vividly apparent if we follow each ridge with our eyes; not losing sight of it until we come to its final termination. With the foretaste of these preliminaries in general, we may now learn to some extent what is the design of the dura mater, and the reason for all its connections.

209. 78. To wit. *That the cerebrum, being expanded by the force of its animation, is forced to again contract by the ultimate force of its reaction, retention and elasticity.* This is the state of every substance in the universe. Where there is action, there is reaction; or where there is a cause of action, there we find a cause of reaction. Thus all things are in balance and poise, and when a change is made, they come back to their natural state. The lungs expand by means of their air; but owing to the reaction of their fibrous contexture, they spontaneously contract. So likewise, the heart is expanded by means of its blood; but by the force of its muscles or of the nerves acting upon the muscles, it contracts. So also with all the other members, muscles and nerves of the whole body. Liquids, spirits, auras, or fluids are what represent the active forces of the world; and when these expand according to their nature, the cause of constriction is ever present; to the end that what was expanded may return to its alternations. Forces, which are thus represented, cause us to move and expand; but fibres and membranes, being passive forces, fight against this and draw us back. Thus we alternately live and die, and there is a perpetual combat and strife between life and death. Similar to this is the condition of the cerebrum and dura mater. When the former acts, the latter reacts, and with it, all the membranes that immediately invest the cerebrum and the individual spherules of its cortex,—which membranes taken together, equal the ultimate forces of the active cerebrum, and finally overcome them.

210. 79. That this gross meninx so holds the cerebrum within its bounds, that the latter is unable to expand any further, or any less, than where, and as far as reason demands, is clear from its encirclement and embrace. For it loosely encircles the whole cerebrum, and is suspended from the cranium by a fibrous, fungus and papillary substance, and, under the coronal, sagittal and lamboidal sutures, by a tendinous and vascular substance; and its charge is, to so grasp the subjacent cerebrum, that its ridges underneath, can swell out lengthwise and breadthwise, according to every extension; can betake

themselves towards the cavity of the vault and fill up every space; and can be so unfolded, as to perform, without delay, whatever effect may be desired in ultimates. It bends and unbends by spirals and circles, in order that it may extend the force of its action under the smooth membrane,* from end to end, without resistance; which force, it finally gives forth in the extremities; and in order that, in the places where it is bound to produce its effect, it may at the same time acquire to itself, from the long extension of its folds, that force which reason demands; and likewise, that, in its course, it may admit into the furrows and into its surface an infinitude of arterial ramifications, and may duly act upon them, to the end that the abundant substance of the cortex, everywhere nourished by blood and volatile essences, and refreshed, expanded, and growing, may be capable of animating and vivifying the whole mass and system of the body.

*The dura mater.

(To be continued.)

THE NEW PHILOSOPHY

Vol. XXIII

JULY, 1920

No. 3

TRANSACTIONS

OF THE

TWENTY-THIRD ANNUAL MEETING

OF THE

SWEDENBORG SCIENTIFIC ASSOCIATION.

The twenty-third Annual Meeting of the Swedenborg Scientific Association was held at 1011 Arch Street, Philadelphia, Pa., on Saturday, May 29, and an adjourned meeting at the Crescent Club, Pierpont and Clinton Sts., Brooklyn, N. Y., on Friday, June 4, 1920. President Lewis F. Hite presided at both meetings.

MEETING OF MAY 29, 1920.

The meeting was called to order at 2:30 P. M. Ten persons were present.

On motion the minutes of the 22nd Annual Meeting, as published in the NEW PHILOSOPHY, July, 1919, were adopted.

It was moved and seconded that the reading of the usual reports be dispensed with. Carried.

It was then moved that we proceed to the election of officers. Carried.

Nominations for president were called for and Rev. Lewis F. Hite was nominated and elected.

Nominations for members of the Board of Directors were called for and the following gentlemen nominated: Prof. A. Acton, Prof. C. E. Doering, Rev. John Whitehead, Dr. F. A. Boericke, Mr. Whittemore, Mr. Wilfred Howard.

The Secretary was instructed to cast the ballot for the above nominees, and they were duly declared elected.

Messrs. Acton and Doering then gave a resumé of the deliberations of the Board of Directors regarding Mr. Alfred Stroh's work in Sweden.

The subject was very fully discussed and the following resolution carried unanimously:

WHEREAS, There is no matter making it necessary for the Association to have a representative or agent in foreign countries; therefore, be it
Resolved, That Mr. Alfred Stroh be informed that the Association hereby discontinues this office.

Messrs. Hite, Acton and Doering expressed their appreciation of the valuable work Mr. Stroh had done in the past, and the following resolution was unanimously carried:

WHEREAS, Mr. Stroh has done valuable work in publishing, editing and promoting interest in Swedenborg's works; therefore, be it
Resolved, That the sincere thanks of the Association are hereby extended to him.

The subject of increasing the dues of the Association was then discussed, and the following schedule adopted:

Membership	\$1.50
NEW PHILOSOPHY to members50
“ “ to non-members	1.00

A long discussion followed, as to possible co-operation by the various bodies interested in the promotion of the publication of the OPERA by the ROYAL SWEDISH ACADEMY OF SCIENCES.

Many proposals were suggested, and it was finally agreed that the Board of Directors draft a resolution expressing the sentiment of the Association; said resolution to be presented at the meeting to be held in New York.

The meeting adjourned at five P. M., to meet in Brooklyn, June 4, at five P. M.

MEETING OF JUNE 4, 1920.

The President announced that this was a special meeting of the Association held during Convention with the idea of stimulating and promoting interest in the work of the Association.

The meeting took the form of a banquet, dinner being served at 6 P. M. Twenty-eight persons were present.

The President announced that the first order of business would be the reading of the President's Annual Address.

The President then read his address, entitled "A Primer of Swedenborg's Science." See p. 80.

An interesting discussion followed as to the use and scope of such a primer.

The President spoke of the desire of the Association to support as far as possible the work of the ROYAL SWEDISH ACADEMY OF SCIENCES in the publication of the OPERA. The subject was discussed at length after which the two following resolutions were presented and carried:

RESOLUTION ONE.

The Swedenborg Scientific Association desires to convey to the Royal Swedish Academy of Sciences deep appreciation of the Royal Academy's interest in Swedenborg's scientific works and especially of the fact that the Royal Academy has adopted and in part accomplished a program for publishing a complete edition of Swedenborg's scientific works. The Swedenborg Scientific Association, in conjunction with other American and English Bodies interested in the promulgation of Swedenborg's science, has enjoyed the privilege of co-operating with the Royal Academy's publication and it desires to renew its efforts to resume and to continue its assistance. The Swedenborg Scientific Association, therefore, would be glad to know from the Royal Academy how much assistance would be needed to resume the work of publication and bring it to a speedy completion. The Swedenborg Scientific Association, with the assistance of other Bodies, desires to do its utmost to raise and contribute directly the needed funds; it would also pledge itself to subscribe for a certain number of copies annually until the whole edition is complete. These subscriptions would be in part for private individuals, for Book Rooms and for Public and Academic Libraries.

The Swedenborg Scientific Association deems it a most important privilege to contribute its share to the monumental work which the Royal Swedish Academy of Sciences is engaged upon in the publication of a complete edition of Swedenborg's scientific works.

On behalf of the Swedenborg Scientific Association,

RESOLUTION TWO.

WHEREAS, The Royal Swedish Academy of Sciences has inaugurated an edition of the scientific works of Swedenborg in the original text, of which edition three volumes have already been published; and

WHEREAS, The Royal Academy has approved a program looking to the continuation and completion of this publication; therefore, be it

Resolved, That the Swedenborg Scientific Association express its great interest in this work and its desire to co-operate with the Royal Swedish Academy in any way that may be feasible; and be it further

Resolved, That the Board of Directors of the Swedenborg Scientific Association be and are hereby empowered to take such steps as they may deem useful for the initiating and carrying on of such co-operation.

A portion of a paper, entitled "Swedenborg's Philosophy in the Realm of Physics and Modern Science," was then read by Mr. W. Howard. See p. 99.

The subject of the Physiology of primitive man was presented by Rev. E. E. Iungerich in a paper assisted by a chart. See p. 86.

An interesting discussion of both papers followed, after which the meeting adjourned at 9:30 P. M.

WILFRED HOWARD,

Secretary.

MEETING OF THE BOARD OF DIRECTORS.

At a meeting of the Board of Directors, held after the first session of the Annual Meeting May 29, 1920. The following officers were elected.

Vice-President, Dr. Felix A. Boericke.

Treasurer, Rev. C. E. Doering.

Secretary, Mr. Wilfred Howard.

Editor of the New Philosophy, and Literary Editor of the Association, Rev. Alfred Acton.

WILFRED HOWARD,

Secretary.

TREASURER'S REPORT

FOR THE YEAR ENDING MAY 29, 1920.

RECEIPTS.

Dues	\$176.90	
Subscriptions to NEW PHILOSOPHY	96.28	
Sale of Publications	111.14	
Contributions	300.00	
	<hr/>	\$684.32
Balance on hand, May 12, 1919..	537.41	\$1,221.73

EXPENDITURES.

Printing, mailing and posting 6 issues NEW PHILOSOPHY, Oct., 1918-Jan., 1920	457.58	
Paid for books at one-half price..	53.64	
Expense of books, binding, stor- age, etc.	155.73	
Petty Cash, postage, stat'y, env...	32.23	
Advertisement in N. C. Magazine	8.87	
Editorial expense	6.30	
	<hr/>	714.35
Balance on hand, May 29, 1920..	507.38	
	<hr/>	1,221.73
Balance includes Royal Academy Publication	\$10.00	
Dues unpaid, 1920	41.00	
Subscriptions unpaid, 1920.....	29.00	
Dues unpaid, 1919	12.00	
Subscriptions unpaid, 1919.....	8.50	
Dues unpaid, 1918	4.00	
Subscriptions unpaid, 1918	2.50	
	<hr/>	
50 persons owe dues and subs. amounting to	97.00	

Respectfully submitted,

C. E. DOERING, *Treasurer.*

Audited and found correct.

F. A. BOERICKE, *Auditor.*

MEMBERSHIP.

Total net membership, May 14, 1919	184
New members	22
	<hr/>
	206
Resigned	5
Lapsed	6
Died	8
	<hr/>
	19

Net membership, May 29, 1920..... 187

The number of paid subscribers to the NEW PHILOSOPHY, namely, 199, is the same as last year, and includes 17 who are not members of the Association.

INCOME AND EXPENDITURES FROM THE FOUNDATION OF THE
ASSOCIATION IN 1898 TO MAY 29, 1920.

INCOME.	EXPENDITURES.
Dues\$3,737.21	Publications:
Subscriptions 2,577.70	New Philosophy:
Advertising 66.00	books, etc.\$8,683.82
Sale of Publications. 851.38	Balance 618.55
Contributions:	<hr/>
A. N. C...\$300.00	\$9,302.37
Convention 300.00	Balance consists of. 507.38
Rotch Tras. 100.00	Bills receivable 111.17
Misc. ...1,370.08	<hr/>
<hr/>	\$618.55
2,070.08	
<hr/>	
\$9,302.37	

NOTE.—The Association has published about 1,500 pp. in book form or a little over 20 per cent. of what is to be done.

BOOKS SOLD.

Brain	2 sets
de Sale Commune.....	1 copy
Economy Animal Kingdom	5
Infinite	1

Fibre	42	(25 of these to London Sw. Soc.)
Generation	4	
Motion and Position	3	
Rational Psychology	3	
Scien. and Phil. Treatise.	20	
Summary Principia	8	
Senses	32	(25 of these to London Sw. Soc.)
Flying Machine	9	
Tremulation	4	
Ontology	2	
Worship and Love of God	1	
Return Kingdom	3	
Book of Dreams	1	
Classified List	22	
Itinerary	1	
Festivus Applausus	2	
Opera Poetica	2	
Swedish Hieroglyphic Key	3	

ACCOUNTS RECEIVABLE.

Total\$111.17

ACCOUNTS PAYABLE.

Total£3.10.8

REPORT

OF THE

EDITOR OF THE NEW PHILOSOPHY.

Since my last report four issues of the *NEW PHILOSOPHY* have been published, namely, July, 1919, to April, 1920, inclusive,—the October and January issue being published under one cover. These issues have included a total of 152 pages, making the average number of each issue 38 pages, or 6 pages in excess of the regular size.

The contents of these 152 pages comprise:

Transactions	38 pp.
Editorials and Reviews	22 pp.
Articles	29 pp.

List of Members	5 pp.
The Brain	30 pp.
A Philosopher's Note Book	28 pp.

152 pp.

The articles include a classified list of the philosophical works of Emanuel Swedenborg, prepared by the editor in accordance with instructions received from the Directors of the Association. The Directors also ordered the publication of the List of Members.

In the editorial notes, special attention has been called to the reprints of early works by Swedenborg, published in connection with the celebrations that were instituted in 1910. Although these works have been on the market for about ten years, yet there has been little sale of them, and it was felt that this was due largely to ignorance or forgetfulness of their existence. The editor, therefore, published an extended series of notes describing each one of these works, and in the same issue the works themselves were prominently advertised as for sale by the Association.

In the January issue we commenced the serial publication of a translation of codex 36. This codex was copied many years ago for the SWEDENBORG SCIENTIFIC ASSOCIATION. It is a note book in which Swedenborg entered, under classified headings, excerpts from Aristotle, Plato, St. Augustine, Des Cartes, Leibnitz, Malebranche, Wolff and other philosophers, together with an abundance of quotations from the Sacred Scripture and the Apocrypha. The whole of the manuscript was not occupied by these quotations, the latter part being used for chapters on Correspondences and Representations, the sketch of a work on Geometry, and sundry notes, mainly of a theological character. The varied contents of this manuscript have suggested to us the title "A Philosopher's Note Book," and it is under this title that the translation of the codex is now being published in the NEW PHILOSOPHY. The portions thus far published have consisted for the most part of excerpts from the works of St. Augustine, and the whole codex shows that Swedenborg was a close student of the writings of this, the most

philosophical of the church fathers. Augustine is indeed referred to in the *ECONOMY OF THE ANIMAL KINGDOM*, but the reference gives not the slightest indication that Swedenborg read those works to the great extent indicated in codex 36. Moreover, as will be readily seen by our readers, the excerpts now published bear out the statement made in our last report that the publication of codex 36 will prove to be a signal contribution to the better understanding of the sources of Swedenborg's philosophy.

During the past year an effort has been made to secure the continuation of the invaluable publication of Swedenborg's scientific Opera, commenced by the *ROYAL SWEDISH ACADEMY OF SCIENCES* under the editorship of Mr. A. H. Stroh in 1907. To this end, the editor, acting under the directions of the Board of Directors, wrote to the secretary of the *ROYAL ACADEMY*, guaranteeing, on behalf of the Association, the purchase of two hundred copies of volume IV of this publication, which is the next volume to be issued. No reply has been thus far received, but it appears that the secretary referred the editor's letter to Mr. Stroh, with the suggestion that Mr. Stroh answer it. In a letter dated May 1st, Mr. Stroh writes, that owing to the increase of 250 per cent. in the cost of making books "the former subscription prices are to-day impossible. Nor can any prospectus be sent out until the volume [IV] is actually printed. There is no immediate possibility for the editor to resume work, as he has been advised not to begin anew until the foreign bodies keep their promises and proposals, as during the former years, 1902 to 1916, when this work was begun, to find the editor's salary."

In a later letter, dated May 8th, Mr. Stroh encloses a translation of a letter to himself from the secretary of the *ROYAL SOCIETY* asking for "the transmission of a copy of the sheets of volume IV already printed, together with an exact statement of what remains to be set up;" and enquiring also how soon the volume could be finished and what remuneration was wished for by the editor. To this letter Mr. Stroh replied that the *DAEDALUS HYPERBOREUS* was the only part now printed, and that this constitutes about one-half of the volume. He gives

no indication of the proposed contents of the rest of the volume, but states that the MS. material is in his possession and that the volume will include an Introduction by the late Professor Duner,—73 pp. in Swedish print which remain to be translated,—and notes and testimonies—presumably to Swedenborg. He adds that if he could receive his salary and devote himself to the work during the summer, the whole MS. could be printed by Christmas or spring.

In view of the implication in Mr. Stroh's letter we would add that no promise of salary has ever been made to Mr. Stroh in connection with the publication of the OPERA. He was employed by several bodies of the New Church to take charge of the reproduction of the Swedenborg MSS., and it was while he was engaged in this work, that he accepted the invitation of the ROYAL ACADEMY to edit the OPERA,—a work which he has performed to the satisfaction of all concerned.

The work of phototyping now has been suspended for over a year, and there seems little prospect of its being resumed in the near future. From Mr. Stroh's letters it is clear that he is unwilling to proceed with the OPERA except under the guarantee of a salary from the N. C. bodies. Under the circumstances, therefore, there seems no prospect of the early resumption of the Academy's publication of the OPERA. However, until we have heard directly from the ACADEMY itself, it is too early to say that nothing can be done in the matter.

We might add that Mr. Stroh has a standing offer from the ROYAL ACADEMY, of an honorarium payable on the completion of each volume of the series and based on the number of pages in the volume. Tentative steps have also been taken with a view to having a similar offer made by the SWEDENBORG SCIENTIFIC ASSOCIATION. But whether such arrangements and a guaranteed subscription for two hundred copies by the Association will lead to the resumption of the work, we cannot say.

In January the Association published a pamphlet of sixteen pages, entitled "A Classified List of the works of Emanuel Swedenborg written prior to 1746, including a few of later date." This pamphlet, which was reprinted from the July NEW PHILOSOPHY, records every line known to have been

written by Swedenborg, prior to 1746, showing (1) what is still in manuscript only; (2) what has been printed but is now out of print; and (3) what is still available. The work constitutes a valuable aid to the librarian and bibliographer, and reveals, at a glance, the great amount of work that lies before the SWEDENBORG SCIENTIFIC ASSOCIATION in carrying out its purpose to translate and publish the philosophical works of Swedenborg. One cannot but be astonished at the great amount of writing by our author, that has never yet been published in any form, or that is now entirely unobtainable except in a few libraries. In this connection, it is gratifying to note the important additions to the available works by Swedenborg that have been made by the activity of the Association.

We had hoped, during the fall of 1919 or the spring of 1920, to have published the PSYCHOLOGICAL TRANSACTIONS referred to in our last report; but an unexpected engagement during the summer prevented the editor from giving the time required for the final work on this publication, and later, it turned out that more work was required than had at first been anticipated. The whole work, including preface and indices, is now happily in print and has been finally passed on by the editor. It should be on the market at the end of June or the beginning of July at the latest.

In conclusion the editor wishes to acknowledge his indebtedness to Professor E. E. IUNGERICH who, in the editor's absence, kindly undertook the final work connected with the issue of the July NEW PHILOSOPHY.

Respectfully submitted,

ALFRED ACTON.—

Bryn Athyn, May 29th, 1920.

PRESIDENT'S ADDRESS.

BY PROF. L. F. HITE.

A PRIMER OF SWEDENBORG'S SCIENCE.

The idea of a comprehensive but condensed statement of Swedenborg's science and philosophy has for some years been before the SWEDENBORG SCIENTIFIC ASSOCIATION, and in a measure before the Church at large.

The idea was presented impressively by Dr. Sewall in his last annual address as President of this Association under the title, A PRIMER OF SWEDENBORG'S SCIENCE AND PHILOSOPHY. It appears from this address that the subject was first broached by some young men in the New Church Theological School and that from them it came through our American Sunday School Association to this body for consideration and action.

Dr. Sewall discussed in a suggestive way the form and contents of such a Primer, and referred to his own little treatise on Swedenborg and the Sapiaientia Angelica as a possible basis for such a work; but he recognized that his little book was not scientific in its form and appeal, and in this way not adapted to a deeper and more systematic exposition of Swedenborg's scientific system.

Among the suggestions which Dr. Sewall offered as to the contents and form of such a Primer was a reference to Swedenborg's SUMMARY OF THE PRINCIPIA, and his CORPUSCULAR PHILOSOPHY, as models of abbreviated statements. In accordance with this suggestion, Bishop W. F. Pendleton presented to the next meeting of the Association, 1916, a suggestive and helpful study, entitled THE PRINCIPIA DOCTRINE OF CREATION, which was a good example of an abbreviated statement of Swedenborg's theory of the origin and constitution of the "Elemental" world. But obviously a Primer which would serve as an introduction to Swedenborg's Science and Philosophy must include his physiology and psychology, and even the great doctrines contained in the ARCANAE CELESTIA and the APOCALYPSE EXPLAINED. The requirements of an introduction as well as an abbreviated statement would not be adequately

met without presentation of Swedenborg's historical relations, and especially his relations to the recent advances of modern science. In this latter direction Professor F. W. Very has done some valuable work in astronomical physics. Some of his results have appeared in the Appendix to the recent edition of the *PRINCIPIA*, 1912, and in the pages of the *NEW PHILOSOPHY*. Professor Very is now engaged in writing an *EPI-TOME OF SWEDENBORG'S SCIENCE*, the successive chapters of which he has been presenting during the past winter to the Swedenborg Club of Cambridge. In this work Professor Very is placing the emphasis on certain critical points of Swedenborg's physical theories, and bringing them in juxtaposition with the latest modern theories, including his own, on these topics.

But work of this kind deliberately departs from the essential character of a Primer, which is simplicity and comprehensiveness of statement. The special purpose of a Primer would be to present Swedenborg's science and philosophy to the general reader, and present them briefly but adequately; and herein lies the difficulty and the problem.

Swedenborg's science covers the whole field of knowledge; and covers it with extraordinary detail and, at certain points, with elaborate and intimate discussion. Only a master of the whole field of science, who is equally at home in all the special branches, could condense this material into the compass and form of a Primer. This condition would seem to make the whole undertaking impracticable; but we may at least define the ideal and leave it to future scholars to realize it.

But even the immediate prospect is not so desperate as this. It may remain true that no one man will ever be able to acquire the all round competence needed to accomplish such a task by himself, but there is nothing to prevent individual New Churchmen from acquiring the desired competence in the several special sciences; and such specialists could well combine their efforts. In other words, the method of "group study" is open to us. In the Annual Address of last year it was pointed out that "In this way, combined, co-operative, work would be done with all the advantages of *group competence*."

We have, in fact, excellent models of the Primer type in the

SCIENCE PRIMER SERIES, put forth a few years ago by a group of eminent specialists, under the editorship of Professors Huxley, Roscoe, and Balfour Stewart. In the list of Primers are Huxley's "Introductory," Roscoe's "Chemistry," Stewart's "Physics," Geikie's "Geology," Michael Foster's "Physiology."

A careful study of these models would leave a strong impression of the kind of competence, and the kind of simplicity, brevity, and comprehensiveness, required for the task we are attempting to define. One chief characteristic of all these models is that the reader is taken directly to the facts which the writer has in mind; and the facts are selected with a view to their familiarity and their universality. Thus in small volumes of 100 to 150 pages each, the great branches of scientific knowledge are brought within easy reach of the ordinary mind.

Considerably more advanced models of high competence and simple but adequate statement, are to be found in some of the volumes of the Home University Library of Modern Knowledge; A. N. Whitehead's "Introduction to Mathematics," and J. A. Thompson's "Introduction to Science," of this series, are good specimens of brief scientific and philosophic treatment within the compass of 250 pages. Here, too, we have the same characters of simplicity, brevity, and comprehensiveness, combined with scientific precision and method.

A Swedenborg Primer should be of the type here indicated; it should present the whole body of Swedenborg's Science and Philosophy with simplicity, brevity, comprehensiveness, and with scientific and philosophic competence..

It is far from the purpose of this address to outline such a Primer; but some indications may be given of the form it might take. In the first place, a good deal might be said in favor of the chronological point of view and procedure, presenting the development of Swedenborg's system as it actually grew in his own mind; on the other hand, there are certain obvious advantages in taking the system as a completed whole, pointing out its historical and chronological aspects by the way.

The latter approach would suggest, as the first question to be asked, What was Swedenborg's final conception of the universe? The answer is found in systematic outline in THE DIVINE LOVE AND WISDOM. It is:

That the universe as a whole, consists of three distinct realms, the Divine, the Spiritual, and the Natural. The Divine is Infinite Love, with its wisdom and operating energy; these three taken together are God, the Lord. The Spiritual realm is the world of spirits, good and evil; further distinguished as angels, spirits, and devils. The Natural realm is the world of bodies, apprehended by our bodily senses. These three realms are conjoined as End, Cause, and Effect. The Infinite Love, which the Lord is, expresses itself in creating a world of reciprocating objects. In this activity, the Infinite Love puts forth a creative and creating sphere which Swedenborg calls the Spiritual Sun. While this Sun is in essence pure Love, it is in appearance a Sun; that is, it appears to spirits as a sun shining in their firmament, just as the natural sun does in ours; only it appears constantly in a fixed position, at an angle of 45 degrees above the horizon.

In these brief statements the whole philosophy of the universe is involved,—the great doctrines of “Proceeding,” “Degrees,” “Correspondence,” “Influx;” in short, the Doctrine of Creation, which combines them all.

The very existence and appearance of the Spiritual Sun as the direct “Proceeding” sphere of the Divine Love, which is the Lord, constitute the first act of creation. The Spiritual Sun is the Divine Love in the act of creating, and it is in essence the love of what is created, both actual and possible. In other words, the Infinite Love (which is God, the Lord), the Love of the Infinite possibilities of its own nature and of the possible objects that could satisfy it, this Infinite Love concentrates and is specific in the act of conceiving and willing and creating a definite, actual, universe; in this concentration, the Infinite Love is the Spiritual Sun, the love of creation.

This is, in brief, Swedenborg’s Doctrine of Creation at its first stage and his doctrine of the Spiritual Sun; his doctrine of the Lord as Creator, as the Love of the created universe. It is the Lord Himself that is this Love, and that appears as the Spiritual Sun to the spirits who live from the Love and who see in the light of it.

But this is not all. The Spiritual Sun which is the “Proceeding” sphere of the Lord and the appearance of the Lord, is

not the Lord as He is in Himself, that is, the Infinite Love; for the very fact that it is this "Proceeding" sphere, this concentration and centering of the Infinite Love upon its work of creation, makes a distinction and a difference between the Spiritual Sun and the Lord, which Swedenborg designates a Discrete Degree of difference, a difference which involves the relation of Correspondence. This fact of correspondence itself grows out of the very nature of Love, as a self-projective, self-representative, and self-realizing function, or essence. The initial and characteristic act of self-consciousness is to discriminate some quality, affection, impulse, feeling, or desire, as embodying, representing, and in a measure realizing the love of which it is a quality. The state so discriminated is a state of the love; in it, the love sees itself represented; in it, the love is definitely and specifically self-conscious; and it selects this state as a case and means of self-realization. We have here Swedenborg's instance of the type of creation (see 2 *E. A. K.* 365); we have here also the primitive situation contemplated by the doctrine of End, Cause, and Effect.

We say, then, that the Spiritual Sun is the self-projected sphere, the self-representative image, the self-realizing agent of the Infinite Love, which expresses itself in these primitive and characteristic functions. The same description holds of the relation between the Spiritual Sun and the heat and light that "Proceed" from it. The whole work of creation is a process of this kind. All the objects of Nature are self-projective, self-representative, and self-realizing functions of the Love which creates them. Men and angels are peculiar and distinctive types of these processes; and it is in man and angel that these processes are best studied and understood. The relation of God to man, as well as the relation of God to the created universe, is best defined and described in terms of these processes. In other words, the created universe, including man, is the self-projective, self-representative, and self-realizing activity of God as Creative Love.

The existence of the Spiritual Sun has been described in these terms, but its appearance also is to be explained in terms of the spirit's self-representative activity. The spirit exists as the self-representative image and likeness of God; that is,

the nature of love repeats itself in the spirit. He himself creates a self-representative environment, and the Spiritual Sun as visual object is the chief feature of this environment. The visual organism of the spirit is a self-representative function, and the appearance of the Spiritual Sun is the product of this function; just as the visual appearance of our natural sun is the self-representative projection of the man's visual organism.

This brings us into the field of human psychology, and into the whole field of psychophysics, where a large part, and the most enlightening part of Swedenborg's science and philosophy are to be found.

The transition from the consideration of the Spiritual Sun to the consideration of the natural sun is the general problem of psychophysics, of which the relation between brain-state and mind-state is the typical and the most accessible case. Swedenborg's psychophysics is a very characteristic and a very complicated body of discussion. Its mastery involves a thorough reading of all his books on physiology and psychology, especially *THE ECONOMY OF THE ANIMAL KINGDOM*, *THE BRAIN*, and *THE RATIONAL PSYCHOLOGY*.

Swedenborg's physics enters very largely into his physiology, and even into his psychology. But *THE PRINCIPIA* seems to take a point of view quite opposed to that form which we have thus far been proceeding. And yet in *THE PRINCIPIA* we are for the most part in a conceptual realm; in fact, it is a system of concepts with which we are dealing almost throughout. The elemental world, of course, is conceived as constituted of physical bodies, such as the aura, the ether, the air, etc. But the points, the finites, the actives, and the prior elements, are for ordinary purposes mathematical entities.

No doubt it would be an important part of the task of a Primer to give a fair account of *THE PRINCIPIA*. But from the point of view of Swedenborg's later science, a Primer would approach the field of physics from the field of psychology, and treat both from the point of view of his spiritual philosophy, his philosophy of Love.

It is only from this point of view that Swedenborg's science and philosophy as a whole can be unified and simplified, and thus brought within the compass of a SWEDENBORG PRIMER.

THE PHYSIOLOGY OF PRIMITIVE MAN.

BY E. E. IUNGERICH.

In an article, entitled "The Ages of Man and the Five Dispensations" (New Church Life, May, 1918), evidence was given to show that the antediluvian era of the human race has its counterpart with each individual in the period beginning with conception in the womb and terminating with the first month after birth. The entire evidence is as follows:

That those should not be numbered who were under a month (cf. *Num.* iii:39, 40), is because . . . the antediluvian world is signified. . . . This time is to be consigned to oblivion; for all that antediluvian world perished, the family of Noah alone surviving." (3 *Adversaria* 6653.) This month of days was therefore an era which preceded the times of the new creation. (1 *Adversaria* 569.)

But how the time between Adam and Noah is to be regarded, has been said, for it is called a month, not a week, in order to signify that then the other [involved circumstances] were gestated in a womb, etc. (2 *Adversaria* 1491.)

That only infancies and innocence should inherit the kingdom of God Messiah, may also be manifest from the life of human ages in the state of integrity. As to what concerns the first month and the uterine age, it is to be passed over. But man's life begins from infancy. . . . (3 *Adversaria* 7651.)

When this whole time is divided into three, *i. e.*, first, middle, and last; then the first is from Noah to Moses, the second from Moses to the Advent of God Messiah, and the third to the end of days, or to the Advent of God Messiah for Judgment. Then the first [period of all], from Adam to Noah, is the time in the womb, an obscure age which is represented in the flood itself and Noah's ark, as above. But when it is divided into seven, then the conception and the dwelling in the womb is, as was said, even unto Noah's going out from the ark; the second is from Noah to Abraham; the third from Abraham to the giving of the Law on Mount Sinai; the fourth up to the Babylonish captivity and the return therefrom; the fifth from this time to God Messiah's Advent into the world; and the sixth or longest, to the end of the world. . . . There are in man, similarly, six ages, the first in the womb, the second is his infancy, the third is childhood, the fourth is adolescence, the fifth is virile age, the sixth is old age." (2 *Adversaria* 524-5.)

As to the other divisions, namely the entire time from first creation to the end of days, or rather from the flood when the very day of birth occurred, inasmuch as the time prior to it was the day of conception and

gestation in the womb, the matter has been considered in the series of subjects, and will be treated of further. (1 *Adversaria* 1082.)

This dream [of Daniel's] signifies the state of the church from the first day of reformation, that is, from Noah, up to the last; for the time before the flood was like conception in the womb, thus a time of oblivion. (*Schm. Marg. at DAN. ii.*)

From conception in the womb to birth and thence on to old age, man passes through successive stages that parallel the religious dispensations transacted by the human race hitherto. The evidence just given aligns the Most Ancient Church, or the period between Adam and Noah's issuance from the ark, with the first ten months of human existence, of which nine are prenatal, and one subsequent to birth. This is the period of primeval dormancy or of lack of awareness of extrinsic phenomena.

We at once are led to ask how far the physiological changes of a foetus into an infant serve to illustrate the difference between the antediluvian and the postdiluvian. In what respect, if any, did the latter also involve physiological differences in the human constitution? That the series of events entailed by the fall of man also caused some physiological changes, is plainly stated in the following teaching anent the garments which Jehovah made for the first pair:

In order that the nakedness of the first-born, which had appeared most comely during the state of innocence, but had now become defiled with the basest splotches; might therefore be veiled over; they were clothed with a new hide or a skin-tunic under the epidermis, and so garbed according to the present state of their life; for Jehovah God is said to have done this, verse 21 [of Genesis iii] in order, namely, that from seeing themselves they might recall to memory that they were about to enter upon the conduct of a natural life similar to that of animals. (1 *Adversaria* 78.)

The following characteristics distinguish the foetus from the infant:

1. Its brain is not instructed by sensations from without coming to the memory, but celestial influences within, store remains for the twin acknowledgments of the One God and a life obedience to His Commandments. 2. Its actions are in-

stinctive and spontaneous, being gestures or enactments flowing from inward urgencies. 3. Its nutrition is purveyed, first through the navel and then by the skin which absorbs material from the circumambient amniotic liquor. 4. The lungs are undeveloped and there is no external breathing. 5. The foetal blood circulation describes a figure 8, the two loops of which cross inside the heart without mingling. This is due to the presence of two structures that are normally obsolete in the infant, viz., the *foramen ovale* or aperture between the right and left upper chambers or auricles, and the *ductus arteriosus* or arterial tube that connects the pulmonary artery with the aorta. The purified venous blood entering the right auricle of the heart by the inferior vena cava passes directly through the *foramen ovale*, and then by the ascending aorta, with but minor loss to the rest of the aorta, goes upwards to the brain. Completing this upper loop, it returns to the heart by the superior vena cava, and, not merging with the stream from the inferior vena cava, it goes from right auricle to right ventricle and leaves the heart by the pulmonary artery. The lungs being closed, exit thither is debarred. It passes onward instead by the *ductus arteriosus* which leads the current to the descending aorta. But a diagram will illustrate these peculiar foetal structures, the *foramen ovale* and the *ductus arteriosus*, better than any description could.

Consider now the peculiarities of primitive man which, in most cases, were not only similar but practically identical with these five characteristics of the foetus.

1. As the foetal brain is instructed by celestial influences solely, so primitive man mainly by perceptions from interior influx. 2. His actions likewise were mainly spontaneous enactments of an inward urging. 3. His nutrition was to an usually large degree from the vaporous exhalations about him, and only sparingly from aliments taken in by the mouth. 4. His lungs were little used, as the chief breathing was internal and what external breathing he had was mainly tacit. 5. His blood-circulation, as I shall subsequently indicate, must have emulated that of the foetus, inasmuch as his brains animated synchronously with the heart. Among postdiluvians, brain-

animation coincides with lung-respiration, and neither of the two agrees with the heart beat except under abnormal conditions.

THE PHYSIOLOGICAL GARDEN OF EDEN.

The cerebellum is the seat of the unpervertible, involuntary functions; the cerebrum, of voluntary and intellectual activities that are under man's control and ken.

The occasional passage (cf. *D. L. W.* 384), to the effect that the cerebellum corresponds to the will and the cerebrum to the understanding, does not teach that the will is located in the cerebellum, but merely that it owes its source of motor power to that organ. Had the will ever been actually located in the cerebellum, then the perversion of the will at the fall would have involved a perversion of the cerebellum. This is obviously inconceivable. For the cerebellum is the involuntary, subtle restorer of disorders in the body, operating beneficently during sleep; and any perversion of it would instantly extinguish human life.

In fact the cerebellum is the original tree of life of the physiological Eden in which primitive man was placed. It was so called by the ancients with whom some perception of this had survived, and it has continued to be so called because of the coincident fact that a dissection through its centre exhibits the darker, nuclear, parts disposed in the form of a tree (cf. *Brain* 674, 680). The life of which it is the tree is the Divine Influx into man's will. This influx comes first into the cerebellum, the seat of the involuntary, and then into the cerebrum to confer that source of motor power we term will. But its entrance into the motor organism of the cerebrum is only by chinks and crannies if the latter be not a receptacle of wisdom to prepare the way for the reception of love. In that case the love that is conferred is linked to man's self intelligence and is thus from the man and a love of what is false.

The Lord regards every man in his forehead, and this gaze crosses into his occiput. Under the forehead is the cerebrum, and under the occiput is the cerebellum. The latter is assigned to love and its goods, the former is assigned to wisdom and its truths. Therefore whosoever looks to the Lord with his face receives from Him wisdom and thereby

love; but whosoever looks backward away from the Lord receives love and not wisdom, and love without wisdom is love from man and not from the Lord. And this love because it conjoins itself with falses, does not acknowledge God, but acknowledges self in place of God, and confirms this tacitly by the faculty of understanding and being wise impressed on one from creation as if from oneself. Wherefore this love is the origin of evil. . . . This is the reason, as you know, that in this spiritual world it is not allowed to stand at the back of another and speak to him, for there is thus inspired in him a love which his own intelligence favors and obeys on account of its delight. But since this is from a man and not from God, it is a love of evil or a love of the false. (*C. L.* 444i.)

Consider also in this connection what is said in the exposition of John's turning to see the speaker of the words heard behind him in Patmos:

Divine influx out of heaven is into man's will and through it into his understanding. The influx into the will is into the occiput because into the cerebellum, and goes thence towards the front into the cerebrum where the understanding is; and when by that way it has come into the understanding, it then also comes into sight, for man sees from the understanding. That there is such an influx has been given me to know through much experience. (*A. E.* 61; c*f.* *ibid.* 55, *H. H.* 251.)

The Tree of the knowledge of good and evil was the afflux from the outside world by means of sensations going to the cerebrum. Primeval man was forbidden to appropriate knowledges from this source, as a controlling factor. His instruction was to come mainly from celestial perceptions via the tree of life or the cerebellum.

The cerebrum in which was stored the record of the instructions that were received and the uses to which they were put is therefore the abode of what is properly under human jurisdiction. It is the Adam, named from ground, who was made in the image of God and cultivated by the favorable reception of the instructions given through the cerebellum in order to become the likeness of God. "Male and female created He them," signify the two main functions of the cerebrum, the sensory or understanding, and the motory or will. Zakar, the male, found also in the word Zachariah (*remembrance of Jehovah*), denotes those sense impressions whose totality is

the field of memory over which the gaze of the understanding sweeps. Nequevah, the female, comes from a root whose meaning is *to perforate, to bore holes*. It typifies the stylus-like will pricking now one, now another, delicate neural beginning in order to engender a motor activity below.

The state then of the most developed mind before the fall was that it perceived in its cerebrum what inflowed thither from the cerebellum or its tree of life. The motor impulses of the cerebrum spontaneously manifested these perceptions by appropriate gestures or actions; and the sensory or intellectual side of the cerebrum made a record thereof as a treasure to enrich other minds whose perceptions differed from its own.

But the fall began in man's dissatisfaction at feeling his indebtedness to the sensible influx from the cerebellum. He wished to feel his intellectual gifts as his own. It therefore was no longer good to the man "to dwell alone" in the presence of God, and so a helpmeet for him was provided. He came into a state of greater obscurity in which the voluntary side of the cerebrum was separated from its intellectual visualizations and made to appear as his own, although the acknowledgment still persisted that it derived its life from the tree of life or the cerebellum. It was called Havah, life, the mother of all being, since the parent of all motor impulses. This was that voluntary which was subsequently tempted by the serpent and became corrupted and irredeemable and had to be segregated or built about by a gopher wood structure, the ark; to enable the future men to ride over the floods of its passionate and destructive impulses. Organically, the serpent is the vascular system whose central determinations are the corporeal fibres, starting from unit pores in the skin and coiling upwards in serpentine flexures as the inner coats of the arteries and the outer coats of the veins to deliver to the cortical glands the atmospheric quota or corporature out of which the animal spirit is to be made. For the love of self, we read "ascended from the nature of the body, through the blood and animal spirit, into the sphere of heaven or the courtyard of the mind, and kindled it with its savage flames, and thus gave a flare of fatuous life" (1 *Adv.* 40), "in order to persuade it to recede

from the perpetual celestial influx, and to give room to the influx through the sensations and so admit only the enticements of the world and the body; . . . thus learning from nature and personal experience and not from divine law, the causes of effects, the uses of objects, and the ends of mediate instrumentalities" (*Hist. of Creation*, p. 18). The will succumbing to this also entrained the understanding to give preference to memory records derived from the gateway of the senses rather than store the perceptions that had been sought out of the cerebellum. From this arose the curse or disjunction between the cerebellum and the rebellious cerebrum and instigating blood stream; and the institution of a new order. The blood stream turbulence was removed from the consciousness of the cerebrum and kept under a grovelling subservience to the rule of the cerebellum. The will of the cerebrum because it had flouted the celestial dictates of the cerebellum, was placed under the domination of its consort the understanding. That this might be effected an actual obliteration or atrophy of cerebellar fibres had to be made with such human beings as could receive the new order without destruction. The rest gradually perished in the dire conflict between the involuntary of the cerebellum and the perverse voluntary of the cerebrum which took place not only in the nervous system but in the subordinate struggle (cf. *A. C.* 560) between a respiration consonant with the blood stream, and one coincident with the rebelling cerebrum.

The understanding could no longer store the salient a priori principles of all things that had come from the cerebellum, but could only through toil and hardship, line upon line, and precept upon precept, till a soil in which were rooted the many brambles and weeds that were associated from the fallacies of the senses.

THE ACTUAL PHYSIOLOGICAL CHANGES EFFECTED.

This revolt of the will of the cerebrum from subservience to the cerebellum, and its subsequent submission to the understanding of the cerebrum, not only entailed great changes in mankind's social environment and behavior, but rested basically

on profound physiological changes in the human body. The former speech, which had been "tacit, perceived by another in his internal man" (*A. C.* 1119); and communicated either optically by changes in the flexible and spontaneous muscle fibres of the face and lips (*A. C.* 607) or else audibly by starting up a vibration in the air volume of the Eustachian tube on the inner side of the ear-drum (*A. C.* 1118), had to be changed. In the face the muscle-fibres from both cerebrum and cerebellum pulled one set against the other, with the result that the countenance has become an expressionless mask in all save uncontrollable flushings and palings and a certain expressive glint from the eyes. For "the fibres from the cerebellum changed their efflux into the face, and in their place fibres of the cerebrum were transferred there, which now control those from the cerebellum, and this from an endeavor to form the expressions of the face according to the behests of man's own will, all of which is from the cerebrum." (*A. C.* 4326.) Speech became external as the result of a change in the respiration, ushered in by the first vigorous use of the lungs; and by the change of the circulatory blood system from a type resembling that in the foetus to the one normal to present day adults.

I am speaking of course of the main breathing they had, the internal breathing proper to the spirit, namely, the animation of the cortical glands. This was of course radically disturbed by the revolt of the will in the cerebrum. The disturbance in the expiratory side of the glandular breathing produced that conflict in the fibres of the face, already noted, but also affected dependent organs as well. But the most signal change was in the inspiratory or inhalatory side of the cortical gland breathing. These inhalations had been synchronous with the diastole of the heart, but were now to be geared into consonance with lung inspiration.

"The man of the Most Ancient Church had an internal breathing, and no external breathing except a tacit one" (*A. C.* 607, 608, 805). This tacit external breathing, taken in connection with the teaching that heart and brain then animated synchronously, must obviously refer to the pulse beat and to

the tremulations of the fibres composing the blood vessels. Perhaps the ones most affected were those composing the inner coats of the arteries and the outer coats of the veins whose use is to purvey atmospheric food from the pores to the cortical glands. These, as noted above, constituted the serpent in Eden. As to the course of the breathing of these primeval people, we are told "that it advanced from the navel toward the heart, and so through the lips without sound" (*A. C.* 1118, *S. D.* 3322). Pray note, that the foetal circulation is from the navel to the heart and thence to the head!

Ponder in this connection what Swedenborg says of his own experience: "My respiration has been so formed by the Lord that I could breathe inwardly, for a considerable time, without the aid of external air; so that my breathing was so directed inwardly that the external senses and acts remained in their vigor. This can be granted to no others than they who are so formed by the Lord, it is so said, save miraculously. I was also instructed that the respiration is so directed, unawares to me, in order that I may be with spirits and speak with them" (*S. D.* 3317).

In my early childhood, when of set purpose I willed to hold my breath; as when they were at prayers morning and evening; also when I wanted the alternations of the breathing to agree with those of the heart, so that the understanding began as it were almost to vanish; and again afterwards, when I was writing in imagination, I had observed that I was holding the breathing as it were tacit. (*S. D.* 3320.)

Notice here that *when the breathing is tacit it has practically come into consonance with the alternations of the heart.* Connecting this thought with the previous surmise about the course of the internal breathing with the Most Ancients, as being that of the foetal circulation, leads me to the following conjecture: The reason why few men are formed nowadays to come into tacit breathing, is because their blood circulation does not approximate to the foetal circulation. The reason the Most Ancient people had this tacit breathing, is because there was an aperture between the right and left auricles securing for them the foetal blood circulation, and the quiver of fibre filaments that was their tacit breathing. Swedenborg

possibly was born with a valve over this aperture that could open or close under control. Possibly those who come into spiritism perforate the partition between both auricles and can never fully close it again.

As to the possibility of there being men even to-day having an aperture between both auricles, I invite your attention to the following teachings from the *ECONOMY OF THE ANIMAL KINGDOM*:

We note first, Swedenborg's quotation from Lower: "After birth, and when respiration begins, the foramen ovale and the arterial duct . . . gradually and daily diminish" (*I. E. A. K.* 351). This suggests that the final closure of the aperture and the final atrophy of the duct may not occur till after thirty days. This would give a reason why the babe does not come to full awareness of outside objects before a month, and therefore why the *ADVERSARIA* correlates the Most Ancient Church era not merely with the prenatal period but extends it further until one month after birth.

We note next, article 355, whose caption is:

Nevertheless in a variety of cases, this foramen may for a long time be kept open from the right auricle towards the left; that is, allowing for a circulation approximating the foetal one. Morgagni reports finding such a condition in a female subject, and also in a male subject at least forty years old. Among the causes why such a state may have existed from birth, Swedenborg puts "connate timorousness" and "a lurking species of primeval dormancy" both of which are suggestive of what we know of the men of the Most Ancient Church. They were certainly primevally dormant to merely natural objective features, and you will call to mind their counterpart in the planet Jupiter who have a connate timorousness about horses. But Swedenborg also concludes that such a state may be induced by accident in later life,—“As in cases of palpitation, sudden and frantic terror, . . . and with those who, on having once to all appearance been dead, are recorded to have been again restored to life.”

I feel like repeating again here the suggestion that one who becomes obsessed by a spirit may in the "palpitation and sudden and frantic terror" at first beholding the unearthly visitor have perforated the wall between both auricles and so become irretrievably a prey to that fiend, like the luckless Glyndon in Bulwer Lytton's *Zanoni*.

In conclusion, notice what is said in Nos. 356-8 about those who have an opening between both auricles, but with the blood going in the opposite direction, from left to right. What is said is certainly suggestive of those with whom the cerebrum and dependent lung breathing was in a violent state of revolt against the cerebellum and grovelling blood circulation. It reminds one of Charles XII of Sweden and of the Nephilim of Gen. vi, 14. "There were Nephilim on earth in those days, and especially after the sons of God had entered unto the daughters of men, and had begotten by them. These were mighty men, who from the age were men of a name."

The passage is as follows: _

We may here observe, that when this foramen is kept open, so as to preserve a passage from the left auricle to the right, it is a sign of the person being of the most robust make in his heart, arteries, and muscles. Hence this phenomenon is to be found in those who from the first breath they draw, feel no connate pusillanimity or fear; consequently in persons of an undaunted frame, whose lungs never collapse for want of a due supply of blood, but their bosom swells, and their arterial blood, giving strength to the muscles, is restricted to the limits of its own vessels, and never deserts them in a spirit of fear (n. 231, 233, 234); who are gifted with a higher order and larger abundance of life (n. 231, 232). For some there are who are such by birth, who from the very womb, cradle, and swaddling clothes, breathe a spirit of valor, which ultimately in adult age becomes heroic. As indications of their character, we find them hastily pushing their way out of the womb into the atmosphere, as if their lofty spirits could no longer brook their confinement; and the moment they come into contact with the air, they salute it with a vigorous sneeze! With a deep yawn, as if tired of infancy, they anticipate the period of their maturity, with compressed fists they pugnaciously contend with their swathes, and rage and fume against any who would impose upon them even the semblance of restraint; and already armed with teeth, they bite the teats of their mothers. But this class of men is rare, and consequently there are but few instances of the kind on record.

THE SURVIVAL OF FOETUSES AFTER DEATH.

The analogy of the prenatal life with the state of the Most Ancients suggests remotely the possibility that a foetus which had never come to natural birth might yet survive. At first sight the matter seems to be settled in the negative by the

teaching that "the will and the understanding do not begin with a man until the lungs have been opened, which does not occur until after birth" (*D. Wis.* iii, 5). But a thought from universal ends, as in *A. C.* 6491, might properly ask if the Lord could not have provided some way by which the careful labor of nine months would not be destroyed just because of some accident in birth. Miss Beekman held it was possible for a foetus to draw in enough of the finest things of nature from its amniotic liquor to enable it to survive to eternity as a structural form, even though this effort to open the lungs should cause natural death. That there is evidence that foetuses as well as infants go to heaven, is testified by the following:

That infants, [and] especially foetuses, are carried away to heaven by a very brief way represented by the cuticular ducts, nos. 1022, 1035. (*Index S. D. Cutis.*)

That foetuses and infants are carried away to heaven by a very brief way represented by the cuticular ducts, n. 1022, 1035. (*Index S. D. Infans.*)

That vexation in the other life, and inaugurations into societies are represented by the vexations of the chyle, and of the bloods in the body; the kinds of vexations being as many as the viscera, n. 1033, 1034. And they are like those of the foods into the stomach and intestines; and like those of the chyles into the lacteal vessels; and of the spiritual lymphs into the lymphatics, into the veins; and of purer things in the beginning of the mouth through the veins and insensible pores, as well as by those things which are infused from the air and ether into the lungs, and through those things which are infused through the cuticular pores from the atmospheres to the brains, like foetuses and infants. Hence the durations of the vexations are known, n. 1035. (*Index S. D. Chylus.*)

It is interesting to note that in both *S. D.* 1022, 1035 infants are mentioned not foetuses, though *S. D.* 1022 speaks of "infants and little ones." It would thus appear that Swedenborg in compiling the Index to his Dairy was inspired to add the word foetus as a further amplification.

It is to be noted that by the term "foetus" Swedenborg means at times the embryo in the womb and also the offspring that has been born. Technically, he probably means by it the being in the stage between conception in the womb and one

month after birth. A person might conceivably argue from this usage that the foetuses which go to heaven are those which died between birth and one month, and that embryos are not meant. The attention of such a one should be called to the following passage:

That the Lord's Providence is infinite and looks to the eternal may be evident from the formation of embryos in the womb. Lineaments to things which are to come are continually projected there, so that one thing is always a plane for another, and this without any error until the embryo is made. Afterwards when birth has occurred, one thing is prepared successively to and for the sake of another so that man may exist perfect, and at length be capable of receiving heaven. If the single things are so provided when a man is being conceived, born, and is adoleseing, why not also as to spiritual life? (*A. C.* 6491.)

Quite so. If there is such infinite care and consummate direction in the building of that most perfect little structure in the womb, and this loving Providence looks to "spiritual life" and "to what is eternal;" elevated reason would dictate that the Lord had undoubtedly provided that any accident which would annul natural birth and the full opening of the lungs to the natural atmosphere, might yet permit a sufficient afflux of the finest things of nature from without, so as to enable the foetus to live on as a being in the life eternal.

SWEDENBORG'S PHILOSOPHY IN THE REALM
OF PHYSICS AND MODERN SCIENCE.

BY WILFRED HOWARD.

In the philosophical works of Emanuel Swedenborg we find a series of deductions of peculiar interest, in their relation not only to physics, the mother of the sciences, but to the whole realm of scientific investigation and research. So completely have these *a priori* deductions covered the field of scientific investigation, that the works containing such deductions have been called the scientific works, when more correctly speaking, they are philosophical in content, and not primarily scientific,—having as an end the creation of a philosophical system dealing with the causes of things, or reaching back to first principles, rather than a mere citation of natural phenomena divorced from a rational enquiry into the causes of such phenomena.

In the writings of the earlier thinkers of the Church we find constant reference to what might be called two opposing systems of science. The true science and false. The true science being based on the philosophical works, and the false on the science and facts for that period.

The fundamental distinction between science and philosophy is one that should be kept clearly in mind. Science, strictly speaking, is the accumulation of facts, or phenomena, observed by means of the senses. It changes or increases in range from day to day as the observations of men increase. In one aspect it is neither true nor false, but is always relative to a given period. Thus the science or the observed phenomena of Swedenborg's day was limited in relation to the science of forty years ago, which period is again tremendously limited to the period of today, and again, the period of today is limited in respect to that of twenty years hence, and so on.

In this connection we read, in relation to the past and the future of physics:

"Ten years hence, will the aim and the method of this science appear to our immediate successors in the same light as to ourselves;

or, on the contrary, are we about to witness a profound transformation? Such are the questions we are forced to raise upon our investigation.

"If it is easy to propound them: to answer is difficult. If we felt tempted to risk a prediction, we should easily resist this temptation, by thinking of all the stupidities the most eminent savants of a hundred years ago would have uttered, if some one had asked them what the science of the nineteenth century would be. They would have thought themselves bold in their predictions, and after the event, how very timid we should have found them. Do not, therefore, expect of me any prophecy." H. Poincare, *Foundations of Science*, p. 297.

But in regard to a philosophy or interpretation of causes producing effects or phenomena, it is clear that such must be either eternally true or eternally false. Thus Swedenborg's "Principia" theory of four distinct atmospheres, the universal, magnetic, ether, and air, is either eternally true or eternally false. It is not a scientific fact of Swedenborg's day or of our own, but a deduction of paramount importance in Swedenborg's philosophical system. How far the observations of modern science confirm this theory will be treated of later. Again, the inter-relation of the above four atmospheres is not a scientific fact of the past or of the present, but a philosophical theory which if true cannot but receive confirmation from the realm of scientific investigation, if not from the present, then from future generations.

The question of how far the researches of modern science confirm some of the philosophical deductions of Swedenborg will be treated of in a consideration of the following subjects:

1. Swedenborg's theory of the water particle, and the work of Professor P. W. Bridgman.
2. The soul of plants, or the plane of the ether and the crescograph.
3. Charles Law and Swedenborg's Bullular hypothesis.
4. Spheres of substances in relation to the reflection of light, color, etc.
5. Constitution and evolution of matter, and Swedenborg's theory of creation.
6. The four atmosphere theory of the Principia.
7. Inter-relation of the four atmospheres.

I. THE THEORY OF THE WATER PARTICLE.

Swedenborg's theory of the water particle and Prof. Bridgman's experiments.

The water particle (treated of in the PRINCIPIA, ch. 9, and in the LESSER PRINCIPIA, nos. 160 to 164), is created by the compression of the air bullæ or aura into a hard spherical, non-elastic, and comparatively solid corpuscle. The figure of the water particle given in the Principia is practically identical with that given in the Lesser Principia, except that in the former it is not quite so solid. See figures 110, Principia, and 98 Lesser Principia. Hence water, according to this theory consists of spherical particles, themselves made up of a series of lesser particles with interstitial spaces between. The well known facts of the solution of substances in water without increasing the volume of the water are proof of the presence of interstitial spaces of some sort.

Under normal conditions water is incompressible owing to the non-elastic nature of its constituent particles; but given sufficient pressure, a breaking up of the individual particles should be possible, with the consequent filling up of the interstitial spaces and thus a decrease in the original volume.

Thus we read in the LESSER PRINCIPIA 162 dealing with the compression of the particle of the tenth kind,

"Hence it follows that they could be no further compressed, except by the greatest possible weight, and in the profoundest depths of the sea."

And later, in no. 164, "We have just shown that as the result of inactivity, such particles of the tenth kind may be broken up; also, it could be shown that this disruption may result from great pressure such as exists in the deepest parts of the sea. For if the depth of the ocean at the first creation extended to the centre of the earth, there would then have been a pressure exerted equal to that of five or six hundred miles of ocean, that is, a pressure proportionate to the altitude; consequently, there would be the utmost pressure or weight. When, therefore, particles are subject to very great pressure, I am inclined to think that that structure of a particle which consists of many enclosed smaller particles, all hollow and not mutually cohering, could not be prevented from being reduced to some other form by pressure, the particles losing their sphericity."

Experiments in which water is subjected to very high pressures have been conducted by Prof. P. W. Bridgman of Harvard University. The following are brief quotations from a paper, entitled "High pressures and five kinds of ice," printed in the Journal of the Franklin Institute for March, 1914.

By way of introduction, it is perhaps desirable to give some idea of the magnitude of the pressures involved. The highest pressures which are ordinarily familiar to us are probably those of modern high power artillery; the average firing pressure exerted in many of our large guns is about two thousand atmospheres, or 30,000 pounds per square inch. The highest pressure reached in the experiment which I am about to describe is ten times this amount; that is, 20,000 atmospheres, or three hundred thousand pounds per square inch. The highest pressure I know of that has been previously measured is 10,000 atmospheres; this was produced by the explosion by nitro-glycerine in a closed vessel; it is about one-half the pressure recorded in the present experiments. Nitro-glycerine subjected to the pressures attained in the following experiments would lose all ability to explode. The pressure exerted at the bottom of the ocean at, say, a depth of six miles, is about one thousand atmospheres; a pressure of 20,000 atmospheres would therefore, be exerted at the bottom of an ocean 120 miles deep. If the average density of the rocks of the earth's crust is taken at 2.5, 20,000 atmospheres is the pressure which prevails at a depth of 50 miles below the surface of the earth.

A long description is then given of the apparatus needed to withstand such pressures.

Regarding the compressibility of waters we read, page 322,

It will be well to mention here that water is not absolutely incompressible, as is commonly supposed, but that its volume may be very appreciably diminished by the application of sufficiently high pressure. Under 12,000 atmospheres a decrease of volume of about 120 per cent. is produced.

The decreased volume of water was not found to be directly proportional to pressure, but curiously enough was more in the nature of a sudden collapse, exactly what we should expect from a liquid composed of spherical units similar to marbles or steel balls, which would of course remain incompressible until the pressure was sufficiently great to crush them and fill in

the hollow interstices with a resulting decrease in the original volume.

Five different kinds of so-called ice were thus formed at different pressures and temperatures, the change from one kind to another being described as follows:

The manner in which one ice changes into another is truly remarkable. We know that water freezes slowly or that ice melts slowly, but some of these kinds of ice will change into another kind so rapidly that the reaction reminds one of an explosion. For instance, if ice (1) is changed to ice, (3) at minus 25° C., the reaction takes place so suddenly that it is impossible to follow the change of pressure which takes place after the reaction. On several occasions I have heard a click in the apparatus when the transformation took place, so rapid was it. (p. 329.)

All that has been shown in the experiments is that at certain pressures and temperatures there is a sudden change of volume. This must mean a change of some kind in the molecular structure of the substance. (p. 331.)

Discussing the rapidity of reaction or collapse we read:

One might expect, however, that in the majority of cases, the change in form is due to a re-arrangement of the molecules, each molecule preserving its individuality. One reason for thinking that this will prove to be the case is that it is difficult to imagine how such exceedingly rapid change from one solid to another is possible if the molecules have to form new bonds with other molecules. The rapidity of reaction suggests rather that the molecules simply snap round on axis from one position of equilibrium to another. There is no way of being certain however, what is the correct explanation in any special case, but this is a fertile subject for future investigation. (p. 332.)

One has only to compare the results of these experiments with the statements of the *LESSER PRINCIPIA*, already quoted, to realize that they present a remarkable confirmation of Swedenborg's theory regarding the constitution of the water particle.

2. THE SOUL OF PLANTS IN THE PLANE OF THE ETHER.

In the *APOCALYPSE EXPLAINED* 1212, and other passages, we read that both animals and plants have the same origin and hence the same soul. From a study of the series contained in

the APOCALYPSE EXPLAINED and the CORPUSCULAR PHILOSOPHY it would appear in general, though not directly stated, that the plane of activity to which the souls of animals and plants are conditioned or determined is that of the third aura or the ether. Electricity, light, radiant heat, etc., are also subject to, determined by, or activities of, the ether. We can therefore suppose that plant life should be responsive to, or in some way affected by electrical forces. The well known experiments of Sir Oliver Lodge and others in increasing the production and quality of wheat by means of charged wires stretched across the field in which the wheat is growing, is a case in point, that suggests some such relation between ether and plant life.

A more striking experiment confirming the same idea, is that made by Sir Jagadis Chandra Bose, who has invented a delicate instrument, called the crescograph, by means of which he has discovered pulsations in certain plants analogous to the heart beat of animals. Similar effects are caused by poisons and stimulants in both animals and vegetables. A leaf of a plant is placed upon a magnetic needle, to which is attached a mirror similar to a D'Arsonval Galvanometer, reflecting a spot of light on a screen, the spot of light moving back and forth across the latter at the rate of ten feet in twelve seconds. If the leaf is stimulated with an electric current, the pulsation and speed of the spot of light quickens. If the plant is placed in hot water, a convulsive movement is shown on the screen, the plant gradually dies, and the spot of light is motionless. Electricity being an activity or manifestation of the ether, it would seem therefore, that one of the most refined instruments of modern science has made manifest a relation between the ether and plant life tending to confirm Swedenborg's theory.

(To be continued.)

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THE BRAIN.

BY EMANUEL SWEDENBORG.

211. 80. Thus does the dura mater clothe the cerebrum, where it behooves the latter to collect its forces and assemble its troops. But in the extremities or termini, it applies itself to the cerebrum, is incumbent thereon, and embraces and encloses it, more closely and strictly. For it is divided into lamina, and it sets the upper lamina under its sutures and above the sinuses, and inserts the lower between the cerebral hemispheres, where, coalescing with the lamina of the other side, it constitutes the falciform process; and also in the posterior region, between the cerebrum and cerebellum,—whence arises the second process or transverse septum.* Both these septa, the one where the cerebrum terminates and the other where it commences, are in the middle of the occiput, insinuating themselves from a prominent tubercle, towards the very centre of the cortical substances; that is to say, to the nates and testes, towards the pineal gland, being carried to the lowest parts by means of a hollow passage, that is, the fourth sinus.† Hence it girds the cerebrum on both sides by a plane extended from the top of the cranium all the way to the medulla oblongata, and, according to Paccioni, this plane is spread breadthwise and robust, all the way to the opposite region, that is, to the base of the clinoid processes, and thence by continued branches, all the way to the anterior clinoid and orbital processes; that thus it may almost join itself to the be-

*The tentorium.

†The straight sinus.

ginning of the falx; the latter being extended to that place from the crista galli, between the bosses of the cerebrum, by a process which is frequently quite large. It thus surrounds, embraces and encloses the whole cerebrum, and so sustains the latter, that when moved, it shall not cast itself aimlessly beyond its bounds, and that it may exercise upon its sinuses, arteries and veins, none but the suitable and due effect. Its processes, therefore, are so united together, that when one is stretched, loosened or torn, the other also is stretched, loosened or destroyed; that each shall bring mutual aid to the other; and shall sustain every force of the whole action from the surface of the cerebrum to its centre, and from its centre to its surface; also from the beginning of the falx to the middle of the occiput, and thence, on both sides, back again to the beginning; and that, on the way and progression, it shall produce an infinitude of particular effects, all conspiring to the one general effect.

212. 81. When therefore the cerebrum expands and fills the whole bony vault, it extends the process of the falx and the transverse septum both lengthwise and breadthwise. Into them, as into its extremities and attachments, it determines the force of its action; and such is the connection and continuity of all its parts, that when it acts upon the one, it acts upon the other. Therefore, when the transverse septum is extended, the falx* also is extended, and the effect is felt also by the lesser processes near the clinoid and orbital processes; and these, becoming somewhat tenser and longer, tense and lengthen their sinuses. The cerebrum not only extends its septa lengthwise but also breadthwise, bringing it towards the lower and interior parts; for the cerebrum is so involved and convolved, that wherever there is a hollow space, whether beyond the surface or within the mass, it fills and crowds it to the full. The abundant ashy substance which everywhere occupies the interior part of the cerebrum at the sides of the transverse septum, being unable to extend the force of its expansion toward the exterior parts, on the septum itself near the medulla

*Here called the *falx messoria* (the reaper's sickle).

oblongata, extends it towards the interior parts and the larger ventricles of the cerebrum; and to this force is added a force from the large corpora striata and optic thalami; a like force comes also from the other side, that is, from the cerebellum, which, being unable to further evolve, must involve itself, that its action may return by a circle and spire. The falx also is ever obsequious to the action of its transverse septum, and when, as a consequence, the dorsum of the corpus callosum is slightly reduced, it is forced to lay itself more deeply between the hemispheres, especially if there be an interjected fibrous substance. Hence the effect redounds on the sinus, which, with the drawing down of its lower border, is obliged to assume a triangular shape.

213. 82. When the cerebrum has extended the forces of its animation thus far, then, since the cranium prevents it from being carried further, and since there is no longer an open cavity to which it can extend its convolution, the gross meninx and the fibres, laceratous tendons, and glands thereof, are so tense, that they have no other aspiration than to return to the pristine and natural state which they have lost. The same is likewise the case with the pia mater and its arachnoid, and with all those extremely delicate membranes that cover the spherules of the cortical substance. And when this is the state of the membranes, it is also the state of the blood and liquor; which, being reduced to narrow compasses in the arteries, veins and sinuses, and being denied opportunity of further efflux by their mouths, presses upon the walls, and thus urges on the compound from its least part. At this signal therefore, the cerebrum is obliged to sound the retreat, to fall back and withdraw, and to reciprocate its alternations. And when, by degrees, the cavities, little channels and vessels are opened; when every fibre with its nobler juice and spirit, endowed with a force of elasticity, is likewise distended; when the blood flows into the places thus made open; then the ability and the manner of constriction is rendered easy. Thus the unanimous assembly of all the parts notifies the cerebrum, and solicits it to return to itself, and, for the conserving of the

state of its kingdom, to alternate its motions, and breathe and respire with the lungs, either by a previous will, or by a will not sensibly previous.

214. 83. Granting then the cause of the resistances, and of the reciprocation thence arising in all the membranes or substances taken together, which, being organic, are in themselves the passive forces of their kingdom, the question then arises, Whence does the cause of the expansion principally come? Based on the above phenomena, the answer is, that this cause lies in the fluid and most fluid substances of the kingdom; consequently in the soul principally, which is the active force of the active forces of her kingdom, or, if you prefer, is its veriest potency. To the soul then, does it belong to animate her cerebrum by previous will, both in the part and in the whole. By her aid does this animation exist in the spirits, called animal spirits, and thus, by order of succession, in all the nervous juices and in all the sanguineous liquor. In this last, is seen the existence of the prior, which, being then divided into its more simple substances, enters upon its least circulation. For fluids, especially the more simple, are animated and endowed with every activity, elasticity and expansibility; and as soon as the soul perceives that there is nothing that will offer further resistance, or sees that the cerebrum is becoming inanimate, she at once intensifies her forces, and in consequence, pours in* all that fluid wherein she resides. It is the soul, then, that seems to be the veriest cause of the animation of the cerebrum.

215. 84. Even more remarkable is the fact that the cerebrum is so woven together, that when it has come to the ultimate bounds of its animation, it is not only the general membrane, together with all the particular membranes of each order or degree, that reacts and restrains it from going further, but also the last or red blood which fills up the arteries, veins and sinuses. For at each turn of the inspiration the blood is so compressed and straightened in its vessels and cavities, that

**Inspirat*,—literally, breathes in, inspires.

it cannot be forced any further; therefore this fluid also sounds the retreat, and urges and strongly demands reciprocation; and this it secures when, divided into purer and white blood by the force of its compression, it stands at the little mouths of the individual cortical substance,—as pointed out above. Consequently, there is such a circle of things, that the fluid, whose purer essence expands the cerebrum, becomes so compressed in the last degree of the expansion, that, both in the compound and in the simple, it desires a state opposite to its former state. From the above premises it follows that there is no principle of expansion without the soul; nor any principle of the soul without the faculty of sensation and volition; nor any principle of the will without the ministration of organs which shall be passive and obedient to the will.

216. 85. The fact that the cerebrum, when expanded by the force of its animation, is at last compelled by the force of the reaction, retention and elasticity of the dura meninx, to again contract, is confirmed by the texture and nature of that membrane,—both its own nature and that which it acquires. It is contractile and elastic; and in all cases where it has been torn from the cranium it adds to its substance, and presses upon the cerebrum. Its tendinous fibres associate together in layers and decussate with each other, the fibres of one layer entering into the texture of another; and together, they form a surface of such nature that they allow of being expanded breadthwise and lengthwise, and when expanded, strive to return to their own state. And, therefore, this membrane, when touched by the dry fingers, seems like a manifold membrane. The falx,—called by many anatomists the suspensory of the cerebrum,—lays the rows of its fibres lengthwise from its origin to its base, and also from its lower border upwards towards its upper hemispheres. In like manner the horizontal septum,* which also joins its fibres with those of the falx and brings them out in every direction. Moreover, pressing on the inmost surface [of these septa] are lacerti or lacertous

*The tentorium.

cords, which send out tendinous cords to supply any lack of forces in the fibrous substance of the meninx itself. In the horizontal septum there are also nodules, which, being twisted and crinkled like women's hair, can unfold in any direction. Muscular glands or glandular muscles* are also set around wherever reason demands their presence; and these send threads directly into the pia meninx, to the end that they may yield to the expanding cerebrum both breadthwise and lengthwise. For according to Paccioni, whenever such glands are found, they are of a brownish and reddish color; and they are set, and, when need demands, heaped up, between the lacerti. Hence they vary in different subjects according to necessity; there being hardly any in some subjects. Nor can any other form be discerned in these muscular granules; so that in their every point, they are capable of being flexed and folded in every direction; moreover they are not connected together by nervous fibres, like muscles in general, but by lacertous fibres. Add to the above, the fibrous substance sometimes seen in the space between the falx and the corpus callosum; also the remarkable fold of the septum near the cranium; its almost oval foramen† near the middle part, and from which spring lacerti; also the foramen‡ near the petral bone; likewise the freedom and flexibility of the horizontal septum and its faculty of expansion as arising from all these circumstances; not to mention innumerable other signs which present themselves to the investigator and confirm our position. Experience also, like that of Ridley and Paccioni quoted above, bears witness that the cerebrum moves the falx, and that when the falx is moved it moves the expanse of the meninx for some distance. The phenomena met with in the pathology of the brain add innumerable confirmations. For when nature tends to an end in her ultimate world, she not only acts by instruments adequate to the purest entities, that is, by mem-

*The Paccionian glands.

†The *incisura tentorii*, through which passes the mesencephalon.

‡The foramen in the diaphragm of the sella Turcica, through which passes the infundibulum.

branes of the utmost delicacy, as in the present case; but afterwards, when she has consociated individual parts into one unit, she acts also by gross and compound membranes; but in such a manner, that there is a unanimous tendency and conspiracy of all the parts to the same general and particular effect.

217. 86. When the cerebrum has thus come to the extreme height of its elevation, and intends to return and exanimate itself, each of its serpentine ridges contracts; the whole cerebrum withdraws from the cavities and sinks down from the cranium, and thus, as regards its length and breadth, decreases in the same way it had increased; and it relaxes its beds, lacerti, muscular tubercles, nodes and fibres, that is to say, the whole expanse of both septa with the meninx, which, from the force of the general elasticity of the tendons and of all the parts, strive to return to their own state.

218. 87. When the cerebrum subsides at its upper part and draws towards the interiors, all the fibres set midway between the pia and dura mater in the neighborhood of the processes and sinuses, together with the filaments extended by the series of glands, are poised in the middle and carried backwards. Hence the vessels emerging from the cerebrum and injected between, or adherent to, the fibrous and tendinous stamens, being now allotted their natural situation and direction, transmit their blood through the more open passages into the mouths of the sinuses, to which mouths the blood eagerly tends; for the tendinous bonds now draw their sides together, and the septum lifts itself from below, and becomes contracted and abbreviated from top to bottom. Hence in the sinuses there is an empty space for the blood; and to fill this space, a new supply comes, as by a species of attraction,—although, as discovered by modern physicists, there is no attraction, but only an appearance of attraction. Thus a new blood comes from the arteries through the vessels into the sinuses. This is the principal effect which the cerebrum, when contracting, strives to produce within the cranium and outside its own mass.

219. 88. From the above it is now evident to the sight, what harm results if the dura mater, loosened from the connections of its cranium, lies incumbent on the bare cerebrum; or if this happens in some places; if hydatids or glandular bodies stop it up with vesicles; if a gelatinous liquor or flatulent fluid occupies the space between the dura mater and the bones, or between that mater and the pia, and impedes the free alternations of the elevation of the cerebrum; or if the above-mentioned mater becomes swollen from overmuch phlegm; or, being enervated or also inflamed, loses its virtue of elasticity; or if it adheres to the cerebrum or pia meninx; or if the vessels which derive the blood from the cerebrum to the sinuses, become tendinous or twisted together. From these causes comes premature old age, stupor, insensibility, loss of memory and understanding, lethargy, cachochymia; and quite often epilepsy, apoplexy, and other direful and for the most part deadly effects, which we shall treat of from experience in our Pathology.

220. 89. From this it is now clear that the cerebrum continually returns to its alternations; that it must be surrounded by a suspensory mater and elastic membrane which shall react when the cerebrum acts, or whose reaction shall answer to its action. That this may be effected without resistance, the incumbent air is kept away by the cranium, and the whole cerebrum and its parts is surrounded by a freer aura, that is, by the ether. But let us now see whither the force of the cerebrum's action upon this mater tends; and thus, in what way the mater reacts and pulls back, outside its processes.

(To be continued.)

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

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ORGANIC MIND, INTELLECT, REASON.

AND. RYDELIUS.

There is great dispute with regard to the term between the intellect and the will. Some say that *truth* is the object of the intellect, others that it is *good*. Thus the intellect is partly active and partly passive. He distinguishes between lucid perception and ardent perception.

The FACULTIES OF PERCEIVING are three in number, namely, sensation, reason, faith. Brute animals have sensation. Man, even the gentile, has sense and reason. The Christian has also faith.

INMOST OR MENTAL SENSE is twofold, namely, intelligence and good mental taste or good sense.

Intelligence is the natural sensation of primary truths. From this sense alone, the mind derives with the greatest ease all those ideas that are called connate, and all the self evident axioms that flow from such ideas.

Good mental taste, together with reason, constitutes the architectonics of the wise; for it is an inmost sensation of that highest happiness which flows from the harmony of one's own will with the divine will; to which is added a discriminating sensation of the extreme vanity and unhappiness that lies within all other and unstable goods. It comes to the mind alone.

Hence intelligence and good mental taste arise from the interior mind; and thus, together with reason of a more sublime kind, they constitute the *pure intellect*.

The INTELLECT is not a sensation, but a representation. It does not penetrate, like the sensation of good and evil, except in misfortunes and miseries.

Imagination and memory together with reason make human *skill*.

REASON is the queen of all the other faculties.

The INTELLECT consists in that free activity which produces the five principal parts of the intellect, namely, direction, reflection, comparison, abstraction, and reasoning.

Direction is the directing of the thoughts to some end. By some, this is attributed to the will alone; but there is not a single theory that does not propose an end.

Reflection. When one purposes an end, he reflects upon himself. This is effected by an active force. Some describe reason as the power of reflecting upon one's own ideas. Philosophers deny reflection to brute animals, though they grant them imagination and memory.

Comparison. In this, some place the whole of the intellect; but comparison commences where reflection ends; [Page 14]

for ideas ought to be compared, and it should be clearly seen in what way they are concordant. By this means, from the ideas of single things, a general idea is acquired, wherein many things are seen simultaneously.

Abstraction comes into play when ideas are abstracted from particulars. Here comes amplification, when one makes a broad general idea from the ideas that are perceived in oneself.

Reasoning exists when the reason concludes a thing to be true or false.

SENSATIONS are passive; and though the brain were full of ideas, still without an activity of those ideas, it would amount to nothing.

The supreme privilege of REASON is to view and propose ends, and the progressions of means.

To *supreme good* answers *supreme reason*.

Subordinate reason comprehends more from the senses, and belongs rather to the imagination and memory.

Architectonic reason is like an architect. Like a ruler, it comprehends the sum of things, under which sum lie specific and particular things of less moment. The end of the architect is the perfection of the whole.

There is a great difference between *practical* and *theoretical skill*.

Reason is judgment.

Reason is not the faculty of sensating; and therefore it is as impossible for reason to explore a thing without the senses, as it is for the eye to hear or the ear to see. To reason belongs the enquiry into the reason of a thing; but to memory belongs the retaining of that reason when found.

Poirettus puts the sensitive faculty above reason; but in this way he prepares for us a slippery and uncertain way to truth; for the senses have no activity.

In the INTELLECT are science, prudence, and wisdom. *Wisdom* is architectonic prudence having in view the supreme good; that is to say, it consists in the complex of all goods. *Science* regards only truth, and it regards good coldly as truth. *Prudence* is founded in sensation and intellect.

HUMAN GENIUS is constituted of three elements, namely, memory, imagination and reason or judgment. But in some men the force of memory prevails, in others the force of imagination and also the force of judgment. For human occupations are so varied, that one man may excel in one thing, and another in another. What is required, is the faculty of discerning, so that men may be selected according to their gift of genius.

In infancy, dependent imagination prevails; afterwards active imagination. Memory then diminishes; and finally, with advancing years, reason begins; and in this also memory and imagination become weaker. Active imagination is strengthened by the intellect. Therefore, in childhood commencement should be made, not from matters of reason, but from matters of the memory.
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For the perception of particulars, reason is not so much needed as memory and sense.

Reason is twofold, architectonic and subordinate. It draws much from the imagination, both dependent and independent.

The cultivation of the intellect by means of sciences depends greatly on our knowing how our studies should be subordinated to that wisdom which ought to be our end. Therefore in childhood the deeper sciences should be taught only in their historical aspect.

To the pure intellect pertain all those matters, the objects of which are not corporeal. From pure sense we are cognizant of all that comes forth from the external corporeal sense and from sensual experience.

Reason is opposed to sense. But the intellect comprehends, as subordinate to itself, sense of every kind, together with reason; that is to say, everything that is involved in perception. Judgment and reason signify one and the same thing. Our whole life is a chain consisting of judgments, desires, and actions, all other things being instruments of execution.

In foolishness the maximum, and in wisdom the minimum, obtains in this world.

If the soul were in its primitive integrity, there would be no difference between art and nature.

AUGUSTINE.

Reason is a certain sight of the mind; reasoning is enquiry by the reason, that is, is the emotion of that sight by means of the things that come to view. Therefore the one is needed for enquiring, the other for seeing (*De Quantitate Animae*, C. xxvii [I, 232E]).

[AUG. Can you make the distinction that] it is one thing to live, and another to know one lives? [EVOD. I know that none but the living can know that he lives,] but whether every living being knows that he lives, I know not. . . . [AUG. You say you do not know that] not every being that lives knows that he lives, although every one who knows that he lives, necessarily does live. . . . [EVOD. I have now learned that living is one thing, and the knowing that one lives, an-

other. AUG.] The knowledge of life is better than life* (*De Libero Arbitrio*, c. vii, [I, 241D,E,G]).

God said, Let there be light. Is this the light that is seen by our carnal eyes? or is it some occult light which it is not granted us to see by the body? And if occult, is it corporeal and extended,—perhaps in the purest parts of the world—throughout space? or incorporeal, like that light in the soul, to which the senses of the body refer the examination of our failings and desires, and which is not lacking even in the souls of beasts? Or is it that light which, to the reasoning faculty, is seen to be the superior light from which every created thing has its commencement? But whatever light is meant, we must still take it as a light that was made and created, and not as that light whereby God's wisdom itself shines, and which was not created, but born. Nor must we think that God was without light, prior to His founding the light now treated of. . . . Light that comes from God by nature is one thing, and light made by God is another. In respect to God, light by nature is God's wisdom itself; while every made light, whether corporeal or incorporeal, is mutable. . . . And perhaps, when men become angels, what they seek will be manifested to them by this very light,—in the briefest space indeed, but yet in a manner most highly agreeable and seemly. . . . There is a light which is seen by the eyes of the body . . . and a light which is sentient life, and which is capable of discerning those things that are referred by means of the body to the judgment of the soul; that is to say, of discerning the white and the black, the melodious and the harsh, the sweet-smelling and the stinking, the sweet and the bitter. . . . Opposed to this light is darkness,—a certain insensibility or unsensuality; that is, an inability to sensate, although things are brought in which might be sensated, if only, in our life, were present that light from which comes sensation. [Nor can there be sensation when the ministering organs of the body are wanting; as in the case

*The treatise *De Lib. Arb.* is written as a dialogue between Augustine and his life-long friend, Evodius, who subsequently became a Christian bishop.

of the blind or deaf. For] that light is in their souls [but the bodily instruments are lacking]. . . . The light whereby the things of the senses are manifest is undoubtedly interiorly present in the soul, although the things that are thus sensed are brought in by means of the body. In living creatures we can see also a third kind of light, whereby we reason. The darkness opposed to this light is irrationality, like the souls of beasts. Therefore, whether you understand *etherial light* or that *sensual light* of which animals partake, or the rational light possessed by angels and men, it was made by God (*De Genesi ad Literam* [Lib. imperfectus] C. v, [III, 167GH, 168-ABCD]).

Darkness was upon the abyss. Was this because there was no light? If there had been light it would certainly have remained and been poured around, as it were; which takes place in the spiritual creature when it is turned to the immutable and incomparable lumen which is God (*De Genes. ad Lit.* L. I, C. i, [III, 174F]).

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The animus is a substance participant of reason, and accommodated for the ruling of the body. An animus enlightened by wisdom, regards its own beginning, knows itself, and understands how unseemly it is that it should seek outside itself what it can find in itself. But when put to sleep by corporeal passions, and seduced by sensible forms outside itself, it forgets what it is and what it was. And since it has no remembrance that it was aught else, it believes itself to be nothing but what it seems to be. By sense it is engaged solely in corporeal things, and by imagination, in the images of corporeal things and of spaces; and by these it is distracted, whether awake or asleep. But when by means of the pure intelligence it rises up from this distraction, and gathers itself together, it is called rational. Reason, then, is that sight of the animus by which it beholds truth by means of itself. But reasoning is enquiry by the reason. Wherefore the former is needed for seeing and the latter for enquiring. . . . The animus sees visible things by means of the body, and invisible things

by means of itself; and it sees itself, in that it sees that itself is invisible. . . . The animus, the ruler, director and inhabitant of its body, sees itself by means of itself. [It does not seek the aid of the bodily eyes, nay] it draws itself away from the senses and to itself, in order that it may see itself in itself, and thus know itself with itself. And when it desires to know God, then by the sight of the mind, it elevates itself above itself (*De Spiritu et Anima*, C. i, ii, [III. 358CD]).

The spirit is called the soul, whether of man or of beast. The spirit is called the rational mind, where there is a spark like the eye of the soul; to which mind belongs imagination and the knowledge of God. The eye of the soul is the mind pure of every bodily failing; the sight of the mind is reason; that of the intellect, vision (*De Spir. et Anim.*, C. x, [III, 359H]).

The word mind is derived from the Greek *μήνη* which in our language means moon; and as the moon rises and wanes and changes with her varying alterations, so is it with the mind (*De Spir. et Anim.*, C. xi, [III, 360A]).

The rational and intellectual lumen whereby we reason, understand, and are wise, is what we call the mind. This is made after the image of God, in such way that it is formed by truth itself, without the intervention of nature. For it is called mind from the fact that it is eminent in the soul; thus it is that more excellent force of the soul from which proceeds intelligence. By intelligence it understands truth itself, by wisdom it loves it; for wisdom is the love of good or the appetite of good. The vision of the mind is intelligence, its appetite is wisdom; the former contemplates, the latter is delighted. When we wish to ascend from inferior things to superior, there comes to us, first sensation, then imagination, and then reason, intellect, and intelligence; and in the highest place is wisdom. The highest wisdom is God Himself; man's wisdom is piety, that is, the worship of God (*De Spir. et Anim.*, C. xi [III, 360B]).

Reason is that force of the soul which perceives the natures, forms, differences, properties, and accidents of things corporeal; and also things incorporeal, though not apart from

the corporeal, except as subsisting in the reason. For it abstracts from corporeals, things that are founded in corporeals, and this, not by action but by consideration (*De Spir. et Anim.* C. xi [III, 360C]).

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The intellect is that force of the soul which perceives things invisible, such as angels, demons, souls, and every created spirit. Intelligence is that force of the soul which lies directly under God; therefore it discerns truth itself, supreme and truly immutable. Thus by sense the soul perceives bodies, by imagination the images of bodies, by reason the natures of bodies, by intellect the created spirit, by intelligence the uncreated spirit. . . . Genius is that force or intention of the soul whereby the soul extends and exercises herself for the knowing of the unknown. Genius therefore seeks things unknown, reason discerns them when found; memory stores them up when judged, [and offers them for further judgment]. Thus there is an ascent from inferiors to superiors, [and the lowest are dependent on the highest]. Intellect is a certain image and likeness of intelligence, and reason of intellect. . . . Sense informs the imagination; imagination informs the reason and makes knowledge or prudence. Again Divine prudence, meeting reason, informs it, and makes intelligence or wisdom. [In reason therefore there is a something that tends to things supernal and heavenly,—which is called wisdom; and a something that looks to things transitory and fleeting,—which is called prudence.] . . . Reason is divided into two parts, an upward and a downward,—upwards to wisdom, downwards to prudence; as it were into a man and a woman (*De Spir. et Anim.* C. xi [III, 360D]).

Reason is assisted from within, because the rational spirit, given by the Creator as a free gift, and capable of knowing truth and loving good, could never attain to the knowledge of wisdom or the affection of charity, unless it were suffused with a ray of interior light, and were enkindled with heat. The intellect and intelligence are assisted from above, because God is fire and light. Therefore light, emitting splendor

from itself, which yet it retains in itself, enlightens the intelligence for the knowing of truth; and fire, emitting heat from itself but not losing it, enkindles the affection for the loving of virtue. And like as the eye does not see the sun except in the sun's own light, so neither could intelligence see the true and divine light except in His light [*O Lord (says the Prophet) in thy light shall we see light*]. (*De Spir. et Anim.* C. xii [III, 360EF]).

Sense and imagination do not ascend to the reason; but, remaining below it, they can draw it down to a certain extent, and, as it were afar off, can behold things to which themselves can never come. In a similar way reason can assist the intellect and intelligence; but it is not able to ascend to their state, because it has its own proper bounds and borders over which it cannot cross. We have sense and imagination in common with all other animals. . . . Reason begins at the point where something is met with that is not common to us and animals. . . . Below reason are the things that we perceive by sense. . . . By the side of reason are the things that we perceive by reason, such as [things agreeable and disagreeable] true and false, just and unjust. . . . Above reason, are things Divine* (*De Spir. et Anim.* C. xii [III, 360FG]).

There is nothing in the mind except the mind itself; nor has it cognizance of any other mind than itself. For when the mind seeks to know what the mind is, it straightway knows that it seeks itself. . . . Nor does it seek elsewhere than in itself. Therefore, since the mind knows itself as a seeker, it certainly knows itself (*ibid.*, C. xxxii [III, 364F]).

In Latin we can call ideas either forms or appearances, [thus translating the Greek word]. But if we call them reasons, we depart from the literal interpretation. For in Greek, reasons are called λόγος, not ideas. . . . Ideas are the principle forms or the stable and immutable reasons of things; which them-

*This last sentence is a paraphrase of the following passage: Above reason are things which neither the sense teaches nor the

reason persuades; but which either are comprehended by Divine revelation, or are believed on the authority of the Divine Scriptures.

selves are not formed, and are therefore eternal and ever in the same state; and which are contained in the divine intelligence (*Octog. Quaest. Q. xlv* [IV, 210F]).

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ARISTOTLE.

Men solid of flesh are dull of intellect, while men soft of flesh are gifted (*De Anima. L. II, C. ix* [II, 35B, Hicks* 91]).

There are two specific differences by which the soul is principally defined, namely, motion in place, and the fact that it understands, exercises prudence, and sensates.† Understanding and exercising prudence seem to be a kind of sensating, since in both these operations the soul judges and recognizes something existent. [And the ancients say that exercising prudence and sensating are the same thing]; as was said by Empedocles. . . . Deception and the knowledge of contraries seems to be the same thing. But it is quite clear that sensating and exercising prudence are not the same thing, for all animals share in the one, but only a few in the other; nor, in the case of understanding, in which there is a right and a wrong, . . . is this the same as sensation (*De Anim. L. III, C. iii* [II, 45DE, 46B; H. 121, 123]).

As is the sensitive in respect to things sensible, so is the intellect in respect to things intelligible. . . . That part of the soul which is called the intellect is not actually a part of existing things, until it understands. Hence it is not in agreement with reason to conceive of it as being mixed with the body. . . . The sensitive is not sensitive apart from the body, whereas the intellect is separable. . . . As things are separable from matter, so also is the intellect. If the intellect is a simple and impassive something, as said by Anaxagoras, and has nothing in common with anything else, one may question how it could understand,—if to think is to be passive; for so far as two things have something in common, the one would seem to be active and the other passive. . . . It must have some in-

*This refers to an English translation of the *Soul*, by R. D. Hicks, M. A., Cambridge, 1907.

†A more literal translation of the Greek would read "thinks, judges, and perceives" or sensates.

telligible ingredient which shall make it intelligible (*De Anima*. L. III, C. v [II, 48E, 49ACE, 50A; H., ch. iv, 132-3]).

Since in universal nature there is one thing which is the matter (the passive), and another which is the cause, and which has the force of effecting, . . . therefore, necessarily, there must be the same difference in the soul also. The one, is an intellect of this kind, because it becomes all things; the other because it makes all things, as a fixed entity, such as light. . . . And this intellect is separable and unmixed and impassive, since it is essentially act. For the efficient is always more excellent than the patient, the principle than the matter. . . . But it is separated, and only then is it itself, and this only is immortal and eternal.* . . . The intellect that can be passive is perishable, and without this it understands nothing. (That is to say, *Light (lumen) flows in from the soul, and it is this intelligent light that is the spirit*) (*De Anim.* L. III, C. vi [II, 50CDE, H., ch. v, 135]).

That which apprehends must necessarily be in the power of apprehending, and be one in itself (*De Anima*. L. III. C. vii [II, 51D, H., ch. vi, 139]).

To the thinking soul appearances are like things sensible. . . . Therefore this soul never understands without an appearance (*De Anima*, L. III, C. viii [II, 52C; H., ch. vii 141]).

*Quoted in 2 E. A. K. 250, 259; and FIBRE, 267.

(*To be continued.*)

SWEDENBORG'S PHILOSOPHY IN THE REALM OF PHYSICS AND MODERN SCIENCE.

(Concluded.)

BY WILFRED HOWARD.

3. THE BULLULAR HYPOTHESIS.

*The Law of Charles and Swedenborg's Bullular Hypothesis.*⁸

This subject has already been discussed in an article published in the NEW PHILOSOPHY, Vol. 16, p. 187. We shall therefore, only refer briefly to the points there presented.

Charles discovered that all gases, unlike liquids or solids, have the same coefficient of expansion; that is, equal volumes of different gases expand equally when subjected to the same quantity of heat. We therefore find that all gases if heated 1° C. expand $1/273$ part of their volume.

Liquids and solids, on the other hand, are not subject to this equal variation of expansion, but have, with one or two exceptions, different coefficients. Taking Swedenborg's general theory of Bullular construction, and applying it to gases, together with his theory of heat as a motion of the ether, which ether is present in the interiors of the gas bullæ, then the phenomena presented by Charles Law is not difficult to explain. For according to the hypothesis of Avogadro, equal volumes of gases have the same number of molecules. Assuming for the molecules a bullular construction, with interiors of subtle matter, or ether, which ether is the universal heat agent of all gases, then it is not unreasonable to suppose that equal quantities of heat will produce equal quantities of expansion in all gases. But for a more detailed consideration of the subject we refer to the article mentioned above.

4. SPHERES AND LIGHT, COLOR, ETC.

Sphere of Substances in relation to the reflection of light, color, etc.

The subject of the probable causes of the reflection of light

has also been treated of in a paper published in the *NEW PHILOSOPHY*, Vol. 18, p. 129. We shall therefore outline only the leading arguments therein presented. It is well known that the perception of objects around us by our eyes is due to the fact that light projected from its source, travelling through or by means of the ether, strikes the objects perceived, a portion of the rays being absorbed by the object, and the remaining portion being reflected, and that the reflected rays carry or convey to the eye the sensation of the object. Were it not for the reflected ray, no object would be seen. Reflection is therefore the fundamental cause of all sight phenomena.

The luminiferous or light-bearing ether, however, is generally considered, because of its tenuity, to possess the quality of passing through all substances. The relation of ether and matter is clearly set forth in Sir Oliver Lodge's "Ether of Space," where we find many citations and experiments tending to prove that the ether is undisturbed in relation to matter or the earth. Thus we read, page 63:

I may say, then, that not a single optical phenomenon is able to show the existence of an ether stream near the earth.

All objects go on precisely as if the ether was stagnant with respect to the earth.

The question that has puzzled many scientists, therefore, is as to the nature of the primal cause of reflection; for we cannot give to matter the properties of universally reflecting or throwing back the rays of light or the ether on the one hand, and of absolute non-interference of ether-activity on the other. To quote from Prof. Grove:

An objection that immediately occurs to the mind in reference to the ethereal hypothesis of light is, that the most porous bodies are opaque; cork, charcoal, pumice-stone, dried and moist wood, etc., all very porous and light, are all opaque. This objection is not so superficial as it might seem at first sight.

Now if matter be built up of separate molecules, then, as far as our knowledge extends, the lightest bodies, such as cork, charcoal, wood, etc., would be those in which the molecules are at the greatest distance, and those in which any undulation of a pervading medium would be the least interfered with by the separated particles—such bodies, therefore,

should be the most transparent. (*The correlation of Physical forces*, p. 127.)

Dr. Saleeby in a treatise on light says:

The reader will not labor under the delusion that when we have stated the laws of reflection and refraction we have in any sense whatever explained them. What in fact is the relation of the ethereal disturbance to the matter through which it passes or from which it is turned back, we can by no means say.

The discovery of unbroken laws, regulating all these phenomena may, and will, however, be expected to lead us to an explanation of them. It is evident that whenever there are laws of phenomena there must ultimately be explanations of them, could these be discovered.

The introduction of Swedenborg's doctrine of the spheres of substances, to my mind gives a probable explanation of the apparent mystery of reflection. Swedenborg's philosophical deduction, that all substances have an active sphere which acts as the soul of the substance, has been confirmed by the scientific discovery that all substances are radio-active.

Such a sphere or ether-activity is the very cause that is necessary to act as a nexus between the delicate and refined ether, and the gross substances of nature, in order that reflections may be possible. The sphere of substance takes the place of the link of intercession which Swedenborg tells us is necessary for the spiritual to act on the material. Thus in the treatise on the ANIMAL SPIRIT we read:

For the most perfect to act upon the imperfect there must be a link of intercession, to take something from the perfection of the one, and the imperfection of the other. The soul is spiritual, the body is material, it follows that this animal humor is both spiritual and material. Were it otherwise, the spiritual could never operate upon the material or *vice-versa*. (4, 5.)

That the power to reflect light-waves is not due to matter in itself, but to a sphere or repulsive force associated with matter, is suggested by the following quotations:

When light falls upon other bodies, part of the light is reflected, at an angle to that of its incidence, though not by impinging on the reflected surface, but by a power acting at a small distance from it.

When rays of light pass near to any body, so as to come within the sphere of its attraction and repulsion, an inflection takes place, all the kinds of rays being bent towards or from the body, and these powers affecting some rays more than others. (Priestly's *Chemistry*, pp. 149 153.)

Generally we may say that when light is incident at the surface of two media, one portion is reflected back and propagated in the first medium, while another portion is reflected and transmitted through the second medium, if it be transparent, but is absorbed immediately at the surface, or within a very small distance from it, if it be opaque. (Preston, *Theory of Light*, p. 88.)

Discussing reflection under the emission theory we read:

"As soon as the molecule comes within a certain very small distance of the surface, indicated by the line PQ, it begins to experience the repulsive action of the surface. (*ibid.* p. 16.)

Finally we have the following suggestive quotation from Swedenborg's *CHEMISTRY*, page 28:

But these substances, becoming and exhibiting colors, seem to be owing to the paths of reflection being filled up in all directions with subtle matter, which matter is compressed and dilated in different ways and degrees according to the shape and calibre of the pores that it enters, and communicates a different refraction to the rays that permeate it, whereby the light is confused and colors of various sorts are presented.

This theory of reflection is more fully discussed in the article referred to. It is of course merely suggestive and the future will tell whether a more profound study of reflection-phenomena will support this theory.

5. CONSTITUTION OF MATTER.

The Principia theory of the creation and constitution of matter becomes a fascinating study of more than historic interest when viewed from the researches of those eminent in the exposition of modern theories of matter.

If, with the Principia theory in mind, we ask the question, What is matter? the answer in brief would be, that matter, the ultimate product of the Creator, was evolved, by means of simple substances emitted from Himself by a process of suc-

cessive involutions or finitizations until that which in firsts was supremely active became relatively passive or inert. Thus in treating of the water particle we read:

I would observe then that in every bubble of water is contained all that had previously existed from the first simple; every genus of finites, actives, and elementaries, of which we have treated in the course of our present work; so that in a small bubble is latent the whole of our visible and invisible world. (*2 Principia*, 341.)

That intermediates coexist in ultimates is evident from the axiom, that there is nothing in the effect that is not in the cause, thus from the continuity of causes and effects *from the first to the ultimates*. (*A. E.* 1207.)

Further, from the TRUE PHILOSOPHER in NEW PHILOSOPHY, July, 1917:

The world itself is a miracle. Whatever exists in any of its kingdoms, whether in the animal, the mineral, or the vegetable, exists by a miracle, because it exists by a contingent means which, by a series of others, is terminated in the Infinite itself as in the first cause of all contingent means. For it cannot be denied that the intermediate causes and changes proceed successively from the Supreme Being who produces all things in the most perfect manner, and conducts them to their destined end.

The above doctrine is so universally contained throughout Swedenborg's works that it is unnecessary to quote further.

The following quotations will give in brief outline the gist of modern theories of matter:

In Gustave Le Bon's *EVOLUTION OF FORCES* we read as follows, page 16, regarding the fundamental principles enunciated throughout the work:

1. Matter hitherto deemed indestructible, slowly vanishes by the continued dissociation of its component atoms.

2. The products of the dematerialization of matter constitute substances placed by their properties between ponderable bodies and the imponderable ether—that is to say, between two worlds hitherto considered as widely separate.

3. Matter, formerly regarded as inert and only able to give back the energy originally supplied to it, is, on the other hand, a colossal reservoir of energy—intra-atomic energy—which we can expand without borrowing anything from without.

4. Force and matter are two different forms of one and the same thing. *Matter represents a staple form of intra-atomic energy*; heat, light, electricity, etc., represent unstable forms of it.

5. By the dissociation of atoms—that is to say, by the materialization of matter, the staple form of energy termed matter, is simply changed into those unstable forms known by the names of electricity, light, heat, etc. Matter, therefore, is continually transformed into energy.

The resolution of matter back to the ether, of which it is successively compounded, is discussed as follows:

In the same manner, doubtless, the worlds of ether constituting the elements of atoms can transform themselves *into vibrations of the ether*. These last, represent the final stage of the dematerialization of matter and of its transformation into energy before its final disappearance.

Thus when the atoms have radiated all their energy in the form of luminous, calorific, or other vibrations, they return by the very fact of these radiations following on their dissociations, to the *Primitive ether whence they came*. Matter and energy have returned to the nothingness of things, like the wave into the ocean. (p. 90.)

Matter is ether already organized, having acquired certain properties such as weight, form, and permanence. The elements of matter formed by condensations of ether are, as shown in the book above quoted, of a minuteness of which we can form no idea, because we have no point of comparison.

In the EVOLUTION OF MATTER by the same author, in regard to the same subject we read:

All the theoretical researches formulated on the constitution of atoms, lead to the supposition that it forms the material from which they are made. Although the inmost nature of the ether is hardly suspected, its existence has forced itself upon us long since, and appears to many to be more assured than that of matter itself. (p. 87.)

Just as pages could be filled with quotations from Swedenborg's works regarding the essential quality and constitution of matter, so also, pages could be filled from at least the more philosophical of modern scientists, resolving matter back to the extreme limit of scientific investigation, namely, the ether.

6. THE FOUR ATMOSPHERE THEORY OF THE PRINCIPIA.

In order to account for the phenomena of gravitation, magnetism, electricity, radiant heat, Hertzian waves, sound, and many

other forces known to physics, two atmospheres have been postulated by physicists, the ether and air. The discrete qualities of these two atmospheres are of course well recognized, the air being the medium for the transmission of sound, and all other forces being associated with the ether.

It is generally agreed that forces existing in the ether are due to, or caused by, a series of ether vibrations of a shorter or longer wave length and frequency or vibration. To clarify this conception some physicists refer to what is known as the etherial keyboard, containing about sixty octaves beginning with a frequency of twenty-five vibrations per second and extending to 28,823,000,000,000,000,000,000 per second. The eye has a range of vision of about one octave existing between the forty-fourth and forty-fifth octave. The eye, therefore, having a very limited range of vision. Hertzian waves of wireless telegraphy extend in general from the first to the thirtieth octave. Other forces have their corresponding place on the keyboard, gravitation being considered by some to occupy the extreme limit, thus making it the effect of an etherial vibration of extremely short wave length. Magnetism is further down the scale although some have assumed it to be the manifestation of another atmosphere or ether.

Modern science, therefore, in general assumes two discrete atmospheres. Swedenborg in the *Principia* states that there are four. The Universal, Magnetic, Ether and Air. To the purer ether or atmosphere, which is Universal, Swedenborg ascribes the force of gravitation (see *J. Post* 312, also the *Five Senses*, 454).

The second or Magnetic aura is the plane of all magnetic forces. The third aura, or Ether, is the well recognized luminiferous Ether of science, electricity and radiant heat being also manifestations or activities of this Ether. The fourth atmosphere or element is the Air.

The interesting question before us is whether the facts and observations of science more readily support the four atmosphere theory of Swedenborg, or the commonly accepted theory of two atmospheres.

Beginning with gravitation, we submit the following quotations:

"Physicists have been able to say nothing more on gravitation than what

is said above. In an important Memoir, of which I reproduce a few passages, Professor Vernon Boys has shown perfectly how inexplicable it remains. 'It seems to defy,' he says, 'all our attempts to abandon the inconceivable idea of action at a distance; for even when we might conceive another mode of action, it is entirely incomprehensible that gravitation should act at a distance without regard to the existence or nature of the bodies in its path, and, as it appears, instantaneously. Moreover, in the actual state of our knowledge, no other physical agent, even among those which depend upon the Ether, has any influence over the direction or the extent of the action of gravitation. The difficulties that we experience in creating a mechanical representation of the Ether are considerable; *but the mode of propagation of gravitation seems still further out of our reach.*'* (The Evolution of Forces, Gustave Le Bon, p. 344.)

"All our knowledge relating to gravitation can be reduced to the following definition: Bodies attract one another proportionally to their mass and in an inverse ratio to the square of their distance from each other. *Of the causes of their attraction, of the manner in which it is propagated, and of the speed of its propagation, we can say nothing.*" (Ibid. p. 343.)

"Gravitation displays this incomprehensible characteristic, which no other manifestation of energy possesses, of not being arrested by any obstacle. The most delicate researches have shown that no body exists which is opaque to attraction." (Ibid. p. 343.)

"It is true that notwithstanding the labors of various scientific men, we are not in a condition to give an explanation of gravitation, but our inability to explain it by no means proves that it is a primary property of matter incapable of explanation." (Preston's Theory of Light, p. 28.)

"Though the law expressing variation in the intensity of gravitational attraction became known over three centuries ago, and though scientific discovery since that time has been more rapid than ever before, we are still unable to explain what causes the stone to fall to the ground. This is indeed a strange fact in the progress of science." (A History of Physics, F. Cajori, p. 61.)

"Whereas, concerning the law of gravitation we dare to assert that we know all there is to be known, concerning the cause of gravitation we know nothing whatever.

We have laid much emphasis on this point, in the first place, because it will lend clearness to our subsequent discussion; but, in the second place, because the distinction between a law and a cause is of cardinal importance in scientific thinking, and because, to our mind, the fundamental distinction between the two finds no illustration so cogent and convincing as the present one.

For we have here a universal principle concerning the details of the operation of which we know everything, but concerning the cause of which we know absolutely nothing at all. * * *

*Italics ours.

For very many years the truth of the law of gravitation could not be asserted save of the earth, objects upon the earth, and the planets in their relation to the sun—that is to say, gravitation was a truth of the solar system, but we could positively say no more. The French Philosopher, Auguste Comte, declared that we should never be able to assert whether or not gravitation acts amongst the stars. He was wrong, for less than fifty years after his death we are able to say that the facts reported in an enormous and constantly increasing number of observations do demonstrate the action of gravitation amongst the stars. *We are, therefore, now justified in believing that it is an omnipresent force.*"* (Treatise on What Gravitation Means, Dr. C. W. Saleeby.)

"By transmitting waves of light at a finite and measurable speed, the Ether has given itself away, and has let in all the possibilities of calculation and numerical statements. Its properties are thereby exhibited, as essentially finite—however infinite the whole extent of it may turn out to be. Parenthetically, we may remark *that 'gravitation' has not yet exhibited any similar kind of finite property; and that is why we know so little about it.*"* The Ether of Space, Sir Oliver Lodge, p. 100.)

From the above quotations we note:

1. That gravitation has not exhibited any kind of finite or measurable property;
2. That we are justified in believing it to be an omnipresent or universal force;
3. That in spite of three centuries of scientific progress no means or instrument has been found sufficiently sensitive to measure its velocity;
4. That in contra-distinction to all other forces, gravitation alone possesses the quality of affecting all substances, in other words, it is the only force known, which acting on all created things, is universal in its plane of operation.

It is well known that the usual ethereal activities of light, heat, electricity, etc., have the same finite and measurable velocity of 186,000 miles per second, thus they exhibit common properties which point to the fact that they belong to, or are activities of, the same discrete atmosphere,—the luminiferous Ether or third Aura of the Principia.

But gravitation, as we have seen, exhibits no such relationship. It is universal in regard to its action on all created things, and has a velocity of transmission that is beyond the power of finite instruments to detect.

*Italics ours.

The facts or truths of nature, so far revealed by science, point irresistibly to the conclusion that gravitation is not conditioned by, or a manifestation of the same Ether or atmosphere that is the cause of light, but the activity of a distinctly higher atmosphere. For as the effects of gravitation are universal, so also must the cause exist in an atmosphere that is universal.

What is true regarding the discrete quality of gravitation is also true in a lesser sense in regard to magnetism, but being an activity of the second aura, it is further removed from the Infinite, less active, comes more readily within the scope of finite measurement, and is less universal in its operation upon substance. Thus some substances are turned to its reception more than others.

The question is, What evidence is there that would lead us to suppose that magnetism is more active or discretely different from the etherial activities of light or electricity? As far as I am aware, no scientist has been able to measure its velocity. Glass, which is a non-conductor of heat and electricity, in no way effects or holds back the magnetic force. Here is a discrete difference which has been noted by some physicists, which suggests at once that the magnetic force is of a higher quality or character than electricity. Magnetism, therefore, seems to assume a position midway between gravitation and electricity, the one an activity with the first aura, the other of the third. The question will at once be asked as to the relation of light and magnetism, for we know that glass is transparent to both forces. In the light of Clark Maxwell's Electro-Magnetic Theory of light, it seems possible that the magnetic force being the primary cause of light may alone pass through the glass, and being undisturbed in its passage recreate the etherial vibration which the eye is tuned to receive. Regarding the opacity of certain substances to ether vibrations, especially Hertzian waves, see Gustave Le Bon's *Evolution of Matter*.

The forces that Swedenborg, in the *Principia*, describes as being distinct properties of the Ether, or third aura, are well known as such in modern science and, as previously stated, consist of light, electricity, and radiant heat. It is now known that they have the same speed of transmission before-mentioned and thus naturally suggest a common cause of activity or discrete differentiation from other forces.

The discrete character of the air, or fourth element, is clearly manifest; being the last in the series of elements, it is apparent to the senses and well within the scope of finite experimentation.

Should we wish to follow the well-known axiom of scientific thought, namely, that science seeks for an interpretation, rather than an anticipation of nature's laws, then with the evidence of scientific investigation before us, are we not forced to the only logical interpretation, namely, that the forces of creation, by virtue of their distinct properties and powers, are the manifestations of, not two, but four atmospheres, the four discrete atmospheres of Swedenborg's Principia.

7. INTER-RELATION OF THE FOUR ATMOSPHERES.

The subject of the effects of the motions of one atmosphere upon another is treated of in "The Infinite" and the "Miscellaneous Observations." In "The Infinite" we read as follows:

"And since there is a contiguity of all the elements, it follows that none of them can be set in motion without the motion being felt, in some measure, in the others also. Where there is a *contiguum*, nothing can exist in one part of it without becoming sensible, to a certain extent, at the other. What occurs at one end goes at once, by contiguity, to the other. When the air moves, the Ether cannot but feel it and the subtler elements too, even the last and first." (p. 198.)

And further:

"Tremulation in air will cause undulation in ether, and this, in its turn, a far greater undulation, indeed, a species of local motion, in the next subtler element." (p. 199.)

In the "Miscellaneous Observations," under the heading "Hypothesis of the Undulations and Vibrations of Bullular particles Nos. 2 and 3" we read:

"But when the air vibrates, the ether may fluctuate and undulate; when the ether vibrates, an element with finer particles than those of ether may fluctuate and so on. Thus the undulation of the lesser element is the consequence of the vibration of the larger."

If the theory enunciated above is true, we are justified in assuming that an air vibration such as sound should create a manifest disturbance in the ether, an ether vibration a magnetic dis-

turbance, and so on. A few experiments have been conducted by those who have studied the problem but with results not entirely satisfactory. (See NEW PHILOSOPHY, 1912, p. 86.)

An electric current being a manifestation of ether, or ether in motion, it is not unreasonable to presume that we should be able to detect the result of an ether flow or activity, produced from sound by means of a sufficiently delicate microphone or ammeter. With this argument in mind, I have conducted many experiments but have been unable to produce a microphone sufficiently sensitive to detect results of a definite or satisfactory nature.

Experiments of a convincing and conclusive character have, however, been performed recently by Admiral Sir Henry Jackson, G. C. B., F. R. S., and described in a paper published in the "Proceedings of the Royal Society," Series A, Vol. 95, No. A, 665, 1918. The paper is entitled "Experiment on the Effects of the Vibration of a Stretched Wire forming part of a closed electric circuit," from which we quote as follows:

"In connection with some experiment involving the use of a thermomicrophone of small dimensions, I tried one of large proportions, to compare its efficiency with that of the small one. It consisted of a loop of silver gilt wire, four feet in length, stretched lightly between two glass insulators, mounted on a stiff wooden batten. It was joined up in a circuit with a ten volt battery and the primary winding of the step up transformer of a three valve (low frequency) amplifier, the secondary winding of the third valve of the amplifier leading to a pair of 60 ohm Brown telephones, which were used for recording *the effects of sound vibrations on the loop of wire.**

"The listener at the telephones was situated in a quiet place some distance from the room in which this wire was fixed, and he could not hear with his naked ears the sounds produced to test the microphonic capabilities of the warmed wire. The response to these sounds in the telephone was well marked, *the wire evidently acting as an efficient, though weak, microphone.** Musical notes, produced by blowing organ pipes at a small siren, were loud and clear; laughing, whistling, and humming, were easily differentiated, though speech was not intelligible.

"The current flowing through the wire was one-quarter ampere and maintained its temperature slightly above that of the surrounding atmosphere. The voltage was then reduced in steps, and, though the intensity of the sound in the telephone was also reduced, after a certain point, *some sounds were*

*Italics ours.

*still distinguishable after the battery had been disconnected and the circuit closed.** The wire was now at the same temperature as that of the air. Thus the microphonic effect cannot be altogether attributed to the temperature of the air being maintained, by means of an electric current, above that of air."

Interesting data is then given in the article in relation to effects obtained by wires of different lengths, sizes, and substances, the use of an amplifier and battery of different voltages in the circuit, etc. The experiments have been successful in establishing results which may be summarized as follows:

That a sound wave or vibration of air has directly stimulated or caused an ether disturbance of sufficient intensity to create in some cases, and to effect in others, a current of electricity, which is recorded or made sensible by means of a telephone receiver. That is to say, as postulated in the Infinite, a tremulation or vibration in the air by means of sound has caused an undulation in the ether.

Taking the next two atmospheres, the Ether and Magnetic, it is of course clear from the study of electro-magnetic phenomena, that an inter-relation or disturbance is obviously present, for it is the basic principle of all electro-magnetic machinery such as the dynamo, motor, induction coil, etc. A current of electricity always sets up or creates a manifest magnetic disturbance, and vice versa, magnetic lines of force cutting any conductor of electricity will always create a current of electricity.

We have, therefore, experimental evidence of an inter-relation of three out of the four atmospheres. A motion of the air directly creating a motion of the ether and the ether creating a motion of the magnetic atmosphere. Eloquent testimony indeed to the truth of Swedenborg's Philosophical deductions concerning the inter-relation of the four atmospheres.

*Italics ours.

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No. I

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER WITH
SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

The soul is like a hand. For the hand is the instrument of instruments; and the intellect is the form of forms,* and the sensation is the form of things sensible. (In our understanding we see not a stone but the form of a stone†) (*De Anim.* L. III, C. ix [II, 53D; H., ch. viii, 145]).

Active thought and imagination induce affections, for they present the forms of actions; and this is rendered especially clear by these two parts, because each separately is an animal [*i. e.*, is living, animated] (*De Animalium Motione*, C. xi [II, 122-3]).

It was said above that there were two parts of the soul, one partaking of reason, and the other devoid thereof. . . . There are also two parts of the mind, both endowed with reason; the one whereby we discern those things the principles whereof can be circumstanced no otherwise than they are; and the other whereby we discern those things [Page 19]

*Quoted in 2 E. A. K. 250, and FIBRE, 267.

† This is Swedenborg's application of Aristotle's words immediately preceding the above citation, namely, "There is no stone in the soul, but the form of the stone. For the hand," etc.

which may come about in one way or another (*De Moribus*, L. VI, C. ii [III, 97AB; *Nichomachean Ethics*,* Weldon, 178]).

Properly speaking, to live is to sense or understand† (*De Morib.* L. IX, C. ix; [III, 165C; Weldon, 306]).

To perceive that we perceive, and to understand that we understand, is to perceive and understand the fact of our own existence; [for existence consists in perceiving or understanding]. To perceive that one lives is counted as among things delightful in themselves; [for life is a good by nature] and to perceive that there is good in oneself is delightful (*De Morib.* L. IX, C. ix; [III, 165E; Weldon 307]).

That the mind is a Divine something* see *De Morib.* L. X. C vii [III, 182 B C; Weldon 337].

That there are in the soul, three things—sense, mind, and appetite,—which have the governance over action and truth, see the *Eudemian*, L. v C. ii [III, 332 D; N. E. VI, ii, Weldon 179.†].

The beginning of taking thought to do something is a desire and reason which proposes to itself some end....Thought alone has no motive power; but only thought which exists for the sake of some purpose, and which is suited for action (*Eudem. or Ethics* L. V. C. ii [III, 323 B = N. E. VI, ii, Weldon, 179, 180]).

Wisdom is the most refined and absolute of all the sciences. It behooves a wise man not only to understand such things as are gathered from principles, but also, when reflecting on the principles, to be able to speak and perceive truly concerning them....For that man is called prudent, who, in all matters, perceives the excellence or goodness of the action suited to the nature of each; and it is to such a man that men have entrusted these matters (*Eudem. or Ethics* L. V, C. vii [III, 327 B C = N. E. VI vii, Weldon 187]).

*The reference is to the translation by J. E. C. Weldon, D. D., Lond., 1906.

†Quoted in 2 E. A. K. 245, 250.

*Cited in 2 E. A. K., 250, 259.

†Chapters IV-VI of the *Eudemian Ethics* are identical with chapters V-VII of the *Nichomachean Ethics*.

That wisdom is knowledge in respect to [first] causes and principles, [see] *Metaphys.* (L. I, C. i [IV, 261 C, Ross‡ 981g]).

We esteem him wise, who can acquire the knowledge of things difficult, such as are not easy for men to know; for merely to sensate, is common to all (*Metaphys.* L. I, C. ii [IV, 262 A; Ross 982a]).

Wisdom must necessarily be in him who has universal knowledge in the highest degree (*ibid.*; [IV, 262 B]). The most difficult things for men to know, are those that are most highly universal, since they are the farthest removed from the senses. And the most accurate of the sciences are those that deal most especially with first principles (*ibid.* [IV, 262 C]).

As are the eyes of bats in respect to the light of day, so also is the intellect of our soul in respect to things that are the most manifest of all. The cause is not in the things, but in ourselves (*Metaphys.* L. II,* C. i [IV, 282E; Ross, 993b]).

[The receptivity of the intelligible, and of substance, is intellect. But it possesses action; so that the latter rather than the former, is the divine quality which the intellect seems to possess; and the act of contemplating is what is most pleasant and excellent. If, thus, it is ever well with God as it is sometimes well with us, it is a matter for our admiration; and if it is better with God, it is yet more to be admired. And it is indeed so. And life also is his.]. The action of the intellect is life; and he is action; and action *per se* is his life,—most excellent and perpetual† (L. XIV, C. vii‡ [IV, 479; Ross, XII, vii, 1072b]).

‡The reference is to the excellent translation by W. D. Ross, M. A., published by the Clarendon

Press, Oxford, 1908. In this edition, the pagination indicates the pages of Bekker's Greek edition.

*By some editors Book II is printed as "Book I the Less."

See the following note.

†Quoted in part in 2 E. A. K., 238, 250, 259.

‡Swedenborg marks this reference L. XIV, C. viii; but this is due to an error in Du Val's edition, where, by a misprint, viii is

put instead of vii. There are a number of such errors in the references to Aristotle as given in Codex 36; and these indicate be-

ARISTOTLE ON DIVINE WISDOM ACCORDING TO THE EGYPTIANS.

A single force of sensating unites the instruments of all the senses, since it flows into them by the intermediation of their own senses, and perceives and discerns the objects of the latter. . . . All the senses are terminated in this force no otherwise than the lines from the periphery of a circle are terminated in its centre; and it cognizes simultaneously and at one moment of time, all the things into which the senses themselves are carried (L. II, C. ix [IV 611BC]).

The excellence of the intelligible world is supreme, the light of all other lights, the good of goods, the dignity of dignities, and the essence of all the things that are,—or rather, that thing which alone is, and beyond which there is absolutely nothing,—. . . the principle by virtue whereof all things are and endure. . . . and to which all things that have desire are spontaneously carried by the inherent property of their nature, which consists in a form expressed by the imitation of that other form (L. V, C i; [IV, 617 D.])

The first light sheds its lumen into the animus (soul) of the upright man, and thereby enlightens his mind. . . . But this first light is not within the animus (soul) but consists in its own essence.

yond a doubt the exact edition used by Swedenborg. We may add that in the case of the *METAPHYSICS* Du Val's edition considerably varies from editions by other editors. For Du Val made a radically new arrangement of the last four books of this work, based on what he considered the logical sequence of their contents. In none of the many editions, both Greek and English, that we have consulted, is Du Val's arrangement adopted. But in these editions also, there is one discrepancy, namely, that by some editors Book II, being regarded as having a doubtful place in the *METAPHYSICS*, is called Ia or "Book I the Less."

Thus in some editions, as in Didot's Greek-Latin edition, Paris, 1874, and in Bohn's English edition, there are only books I to XIII, but two books are marked I (I and Ia); while in other editions, as in Ross' translation and the Bekker edition, the books are I-XIV.

The re-arrangement made by Du Val is shown in the following table, the first column showing the numeration adopted by Du Val, and the second, the ordinary numeration:

XI	= XIII (XII)
XII	= XIV (XIII)
XIII	= XI (X)
XIV	= XII (XI)

For this reason,—all its attributes being circumscribed—it flows by means of the intellect* into the animus (soul). Different is the case with all other things; for these act by means of inherent attributes and not by essence itself. . . . The *primum agens*† acts by essence. . . . It is absolutely unique, and can in no way be multiplied; thus neither can it be changed. It does not receive anything from another; but nothing can be the property of others, that does not receive something from it. . . . This *primum agens* acts without a subject, and by virtue solely of its own essence; therefore the intellect is called eternal. . . . If one aspires to the knowledge of it, this must be sought among spirits. For spirits are pure; and being nothing but intellects, they have ineffable beauty; and to him who contemplates them, will come a beauty like to theirs (L. IV, C. vi; [IV, 620BCD, 621 A].)

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In the intelligible world everything moves with a vital motion. . . . It is a living region, . . . and whatever progresses in that world, progresses from the beginning of the way to the end; namely, in the manner in which end and beginning are found there. [It progresses to the end, in such a way that it is not removed from the beginning,—just the opposite to what is the case in this lower world.] (L. VIII, C. v; [IV, 634A]).

That which in itself is intelligible and vital, is also ever the same, and is ever circumstanced in the same way (*ibid.* [B]).

The substance of the intellect can in no way be changed. But the intellect is a universe of forms [since it contains within itself, the universe itself, and the very form of things]. Nor is a thing itself impressed on the intellect, but the intellect fashions for itself something like the thing, and accommodated to it. . . . Thus the artificer fashions for himself a form in his mind, and afterwards

* By the intellect the author of the DIVINE WISDOM means, that principle which flows into all living things and "has the force of the universe." "In the intelligible world (he says) it contemplates

itself; but in the world that comes to our sensation it contemplates, sometimes the essence of that world, and sometimes the things themselves" (II C. iv; [IV, 608A]).

† The first active.

expresses the likeness of this form in matter (L. VIII, C. vi; [IV, 634C, 635A]).

Ignorance of our own excellence and of other things, comes from the fact that we are impelled to learn by the senses alone. . . . Nor do we abstract our thought; but, drawing our discipline from it, and supposing ourselves to have experience of everything, we are in the habit of saying, that what does not come to our sense is nothing.* Wherefore, driven by these suppositions, we do not grant the existence of an intellect that is active, nor of one that has power, nor of a first founder, nor of any other essence of the kind. . . . Virtues are conserved by the animus (soul); this by the active intellect; and the intellect by the primary essence, the effective cause of all things. The animus is certainly not the body, but the cause of the body. . . . Sometimes, being recalled from the sense and turned to the animus, we are cognizant of things we have never perceived by sense. . . . The faculty of the animus does not sensate, unless the judgment be carried from the first sense, by means of the animus to the active intellect, and back from this to the animus, and from the animus to the sense, which latter receives it as its own faculty (L. XIII, C. xx; [IV, 662DC, 663ABC]).

What flows in from the intellect to excite and follow up the divine appetite, cannot be communicated to that among created things, which, from its essential property, is actuated by the agitation and motion of thought. For in such case, matter, which of its own nature inclines to thick and dense darkness, would in a way force the essence of the soul under its own empire. But that which flows in, excites to motion by its own force, transferring the motion from one state to another. And thereby it brings it to pass, that the motion of thought is in no way felt in matter (L. XIII, C. iii; [IV, 665BC]).

The primary man perceives by a deeper sense than the lowest man. Superiors receive no power flowing from inferiors; but contrariwise, inferiors receive from superiors. . . . Therefore the lowest man receives power from the supreme man. And although the former also is partaker of sense, yet this is not to be compared with that which sensates purely, and thus sensates

* Quoted in *Fibre*, 142.

deeper things. For there the sight beholds universals, while here, by reason of its feebleness, it beholds singulars. The former sight also is more powerful [since it falls upon more illustrious and noble objects, while] the latter [which is joined to the body] is imperfect, since it beholds things ignoble and lowly, wherein are the images of things superior (L. XIV, C. vi; [IV, 671-2]).

In man, the force of thinking brings to the intellect the thing perceived by the sense; if it approves this thing, it also receives it; but if it disapproves, it rejects; and sometimes, turning to the sense, and, returning again to itself, it turns the matter over many times, until it assents to it as having manifest truth. The human intellect is nearer to primary intellects, and is, therefore, clearer than all others. For there is a first intellect, like the Divine; a second, like the rational and human; and a third and lowest, which is void of reason, like that of brutes. Of the latter nature, is the force of thinking, when far removed from the noblest intellect. . . . It behooves every animal to follow up some perfection from the intellect wherein is the principle of its forces and life (Lib. XIV, C. viii; [IV, 673ABCE]).

Animals have intellect and life from the primary intellect, according to their state. . . . Dignity of forms exists according to the nobility of similar animals, of which one is subordinate to the other* (L. XIV, C. ix; [IV, 673 BC].)

No one can interiorly behold the things in the superior world, unless, by increasing the forces of his intellect, he has allayed the senses, and has acquired knowledge by assiduous contemplation of mind, and not by reasonings derived from the images and signs of things such as are used in dialectics (L. XIV, C. xii; [IV, 675D]).

For the continuation, see p. 135.

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JUSTIFICATION, FAITH, THEOLOGY, GOOD WORKS.

ANDR. RYDELIUS.

Brutes have sense; man, even the gentile, has sense and reason; the Christian has also faith.

* *I.e.*, taking man as an animal, ternal and external man.
the "similar animals" are the in-

Faith excels intellect; it neither sees nor perceives what is believed. Otherwise it would be reason or intellect.

AUGUSTINE.

Both in commencing and in perfecting every good work, our sufficiency is from God. [Thus no one is sufficient unto himself, either for the commencing of faith or for its perfecting; but our sufficiency is from God]. For if faith is not a matter of thought, it is non-existent; and we are not fit to think anything as of ourselves, but our sufficiency is from God. . . . He therefore makes the faith of the nations, who is able to do what he has promised. Moreover, if God operates our faith, acting upon our hearts in a wonderful manner that we may believe, is there any reason to fear that he cannot do the whole work? and shall man therefore arrogate to himself its first parts, that he may merit to receive its last from God? . . . It is therefore grace (*De Prædestin. Sanctorum* (L. I, C. ii; [VII 485-6; 3 *Anti Pelagian Writ.* 124-5])).

MALEBRANCHE—*De Veritate*.

In matters of faith no evidence must be asked for, as in the things of nature. The credit or authority of philosophers is to be held as of no account. In a word, the man of faith ought to be blind, that is, he ought to believe in revelation, rather than in his own reason, even when the latter resists. But the philosopher must be keen and perspicacious (L. I, C. iii [p. 14; 1 Eng. 20]). LEIBNITZ *De Conformitate Fidei cum Ratione*.

The matter with which faith is concerned is truth revealed by God in an extraordinary manner; and reason is a chain of truths; but specifically (if we compare it with faith) it is a chain of such truths as the human mind can attain to by its own native force unaided by the light of faith throughout (§ 1 [p. 446*]).

Pure and naked reason as distinguished from experience, treats only of truths in no way dependent on the senses. . . . But they must be understood solely by the internal motion of that divine spirit which occupies our minds, convinces them, and impels

* In the references to Leibnitz, the page numbers, except where otherwise specified, refer to the edition of *Tentamina Theodicaeae*,

published in Franckfurt and Lipsia, 2 vols. 1739. This is the edition used by Swedenborg.

them to good, that is, to faith and charity; so that it does not always need motives (§ 1 [p. 447]).

If there is a demonstration resting on principles or facts everywhere manifest, and composed of eternal truths cohering together in mutual connection, then the conclusion is certain and is above all dispensation, so that the opposite must be false; otherwise two contradictory propositions might both be true. If an objection does not have the force of demonstration, it can form only a probable argument, which is devoid of power as against faith; for it is plainly recognized that the mysteries of religion are contrary to appearances (§ 3 [p. 450]).

Among the Italians, flourished a sect of philosophers who opposed the conformity of faith with reason which we are here defending. They were called Averroists, from [their leader] the celebrated Arabian writer, etc. (§ 7 p. 458]).

In the year 1666 when Ludovicus Meyer, a medical man of Amsterdam, published anonymously a book with the title "Philosophy the Interpreter of Scripture," . . . the Dutch theologians were greatly disturbed. . . . Hence there came into use in Holland, the designations *rational* and *non rational* theologians. Baelius* makes frequent mention of them, and he finally declares himself as opposed to the rational. But whether set rules,—received or not received by both the schools—were then formulated in respect to the use of reason in the explanation of Sacred Scripture, is not clear (§ 14 [p. 471-3]).

That philosophy should be the handmaid of theology and not its mistress, was [Page 22]

taught by Robert Baron, the Scotchman, in the very beginning of his book entitled "Philosophy the Handmaid of Theology" (§ 17 [p. 476.]).

[On comparing *Rational Theology*, by Nicolai Vedelius, with its refutation by Joannis Musaeus, I find that they almost agree in the principal rules touching the use of reason, but disagree in the application of these rules.] They agree that revelation cannot be opposed to truths, the necessity of which is called by the

* The reference is to *Dictionaire Bayle* (6th ed., 4 vols., Paris, 1741). *Historique et Critique* par Pierre

philosophers Logic or Metaphysics; that is, truths, the opposite of which involves a contradiction. Moreover both admit that revelation may be repugnant to axioms, the necessity of which is called Physics, which latter science is founded only in laws prescribed to nature by the divine will (§ 20 [p. 482]).

I think that theologians of all opinions, excepting mere fanatics, agree at any rate that no article of faith can involve a contradiction or can be opposed to suitable demonstrations, equal in their certainty to mathematical demonstrations (§ 22 [p. 483-4]).

There is a distinction between things above reason and things contrary to reason. [For what is contrary to reason is opposed to truths absolutely sure; but] . . . what is above reason is in conflict only with those which we customarily experience or understand. . . . That truth is above reason, which cannot be comprehended by our mind, nor indeed by any created mind. Of this kind is the Holy Trinity, and the miracles proper to God alone, such as creation, and election of an order of the universe dependent on a universal harmony and a distinct knowledge of things simultaneously infinite. But no truth can ever be contrary to reason; and a dogma rejected and condemned by reason is not so incomprehensible that its absurdity cannot be said to be comprehended with the utmost ease (§ 23 [p. 485-6.]).

Mysteries are opposed to appearances, and if they be examined in the forum of reason alone, they have no verisimilitude; but it is enough that there is no absurdity in them (§ 28 [p. 493]).

Scripture admonishes us that the wisdom of God is foolishness with men, [I Cor. 2¹⁴]; and also the declaration of the Apostle, that the gospel of Jesus Christ is a stumbling block to the Jews and a foolishness to the Greek [*ib.* 1²³] (§ 29 [p. 493]).

In certain objects of faith two qualities are met with, which concede the triumph of faith over reason; the one being *incomprehensibility*, and the other *unlikelihood*. But care must be taken that a third quality be not added, to wit, that quality, of which Baelius speaks, whereby we confess that what we believe *cannot be defended*. For this, on the other hand, would be to concede the triumph to reason, in a way which would destroy faith (§ 41 [p. 507-8]).

Baelius is of the opinion that human reason is the principle of

destruction, not of construction; that it is a profligate who knows not how to restrain himself, and that, like Penelope, it is always unweaving its own work. In I Corinthians 2^s, Paul exhorts the faithful diligently to beware of philosophy (§ 46 [p. 511-2]).

Luther's sharp book against Erasmus abounds in observations directed to those who argue for the subjection of revealed truths to the tribunal of our reason. Calvin frequently inveighs in the same way against the inquisitive audacity of those who scrutinise the Divine counsels (§ 49 [p. 515]).

It may be of use to observe that he who proves a thing *a priori* gives the reason of that thing by its efficient cause; and he who can give reasons of this kind accurately and satisfactorily, is also able to comprehend the thing itself (§ 59 [p. 526]).

That in us which is opposed to mysteries, is not reason, nor natural light, nor a chain of truths; it is corruption, it is error or prejudice, it is darkness (§ 61 [p. 529]).

Right reason is a chain of truths, but corrupt reason is mingled with prejudices and affections (§ 62 [p. 530]).

Baelius says that when a square tower, seen at a distance, appears to us as round, our eyes bear the clearest testimony, not only that [Page 23]

they note nothing square in the tower, but also that they see a round figure there,—which is in consistent with a square figure. And so it may be said that the truth, which is a square figure, is not only above the testimony of our feeble sight, but also against it (§ 64 [p. 534-5]).

We can reach to that which is above us, not indeed by penetrating, but by defending it; just as we can reach to the sky by sight, but not by touch (§ 72 [p. 543]).

I grieve for the fate of those learned men who with labor and zeal make trouble for themselves.* Something of the kind happened of old to Peter Abelard, Gilbert de la Porree, and John Wickliff, and, in our own day, to the Englishman, Thomas Albius, and several others, who too eagerly immersed themselves in the explanation of mysteries (§ 86 [p. 558]).

Meanwhile St. Augustine does not despair of the possibility of

* The fate, namely, that in their fall into Sabellianism (*ib.*). endeavor to escape tritheism they

finding the desired explanation in this life; but he deems that this task will be reserved for some holy man, peculiarly enlightened by grace (§ 87 [p. 559]).

SACRED SCRIPTURE.*

For by grace are ye saved through faith; and that, not of yourselves; it is the gift of God (meaning that Christ has given it to us); not of works, lest any man should boast (*Ephes.* ii, 8, 9). "Knowing that man is not justified by the works of the law, but by the faith of Jesus Christ. . . . By the works of the law shall no flesh be justified. . . . For I through the law am dead to the law, that I might live unto God. . . . I do not make void the grace of God; for if righteousness comes by the law, then Christ died without cause (*Gal.* ii, 16, 19, 21).

That no one is justified by the law in the sight of God . . . for the just man shall live by faith. . . . That the law was our schoolmaster looking to Christ, that we might be justified by faith etc., etc., (*Gal.* iii, 6-11, 21, 22, 24, 25).

In the spirit, by faith, we wait for the hope of righteousness (*Gal.* v, 5).

Faith worketh by charity (vers. 6).

By Christ the world is crucified for me, and I for the world (*ib.* vi, 14).

Justice is revealed from faith to faith; . . . the just man shall live by faith (*Rom.* i, 17).

Not the hearers of the law are just before God, but the doors of the law shall be justified (*Roms.* ii, 13).

[Where is boasting? It is excluded. By what law?] of works? Nay, but by the law of faith. Therefore we conclude that a man is justified by faith without the works of the law. . . . It is one God which shall justify circumcision by faith, and uncircumcision through faith. Do we then by faith make the law of no use? God forbid; we establish the law (*Roms.* iii, 27, 28, 30, 31).

* The quotations are made from the translation by Beza, and probably were taken from the *BIBLIA SACRA*, translated by Tremellius and Junius (Old Testament) and Beza

(New Testament), published in Amsterdam, 1669. A copy of this edition was in Swedenborg's library.

David declareth, Blessed is the man to whom God imputeth righteousness without works (iv, 6, 7, 8).

Not by the law was the promise given to Abraham; but by the righteousness of faith (iv, 13).

For as ye have yielded your members servants to uncleanness and the doing of iniquity, so now yield your members servants to justice unto holiness (*Rom.* vi, 19, 22).

There is no condemnation for them which are in Christ [Jesus], which walk not after the flesh but after the spirit. . . . That the righteousness of the law might be fulfilled in us, who walk not after the flesh but after the spirit. For that which savoreth of the flesh is death, but that which savoreth of the spirit is life and peace. . . . because that which savoreth of the flesh is enmity before God.* . . . If ye live after the flesh it shall come to pass that ye shall die; but if ye in spirit do mortify the deeds of the body, ye shall live. . . . For the world was made subject to vanity, not willingly, but because of him who hath subjected it unto vanity (*Rom.* viii, 1, 4, 6, 13, 20).

As to what the works of faith and charity are, see xii, 9-10.

The night is far spent, the day is at hand; let us cast off the works of darkness, and put on clothing that is suited to the light (xiii, 12).

He that doubteth is condemned if he eat, because he eateth not from faith; for whatsoever is not of faith is sin (xiv, 23).

For I know nothing of myself; but not by this am I justified; the Lord, He it is that judgeth me (*I Cor.* iv, 4).

And now abideth faith, hope, charity, these three; but the greatest of these is charity (ch. xiii, 13). See further concerning charity in the same chapter.

Our boasting is this, namely, the testimony of our conscience, that in simplicity and Godly sincerity, not with carnal wisdom but with the grace of God, we have conducted ourselves in the world (2 *Cor.* ii, 1, 12).

As to the good works of the ministry see vi, 4-10.

And we see that they cannot enter because of unbelief (*Heb.* iii, 19).

* Beza (and also Castellio) has which, Swedenborg alters to *Coram adversus Deum* (against God), *Deo* (before God).

For it is impossible that those who once have been enlightened, and have tasted of the heavenly gift and been made partakers of the holy spirit, etc., . . . if they fall away, shall be again renewed into repentance, like men who afresh crucify for themselves, the Son of God, etc. (*Heb.* vi, 4, 5, 6.)

It is faith by which things hoped for exist, and which demonstrates things not discerned. For many examples of faith see *Heb.* xi, 1 *seq.*

Without faith it is impossible that anyone can be pleasing to God; for he that cometh unto God must believe that God is, and that he rewards them that seek Him (*ibid.*, 6).

Let him ask for wisdom in faith, nothing doubting; for he that doubteth is like a wave of the sea that is driven with the wind (*James* i, 6, 7, 8).

For whosoever shall keep the whole law and yet offend in one point, he is guilty of all. . . . Faith, if it hath not works, is dead, being alone. . . . I will shew thee my faith by my works. Thou believest that there is one God; thou dost well; the devils also believe and tremble. . . . Seest thou that faith was the minister of his work? . . . Ye see then that a man is justified by works and not by faith only. . . . For as the body [Page 24]

without the spirit is dead, so likewise is that faith dead, which is without works (*James* ii, 10, 14, 17, 18, 19, 20-26).

The trial of your faith by temptations is much more precious than the trial of gold [that perisheth; and though it be tried by fire] it will be found to be for your praise and honor and glory when [Jesus] Christ shall be revealed, . . . bearing the reward of your faith, the salvation of your soul [*I Pet.* i, 7, 9].

The Father, without respect to persons, judgeth according to every man's works (*ib.* 17).

That ye might be made partakers of the divine nature, having escaped the corruption that is in the world through lust (*2 Pet.* i, 4).

This is the victory that overcometh the world, even our faith. Who is he that overcometh the world, but he that believeth that Jesus is the Son of God? (*I John* v, 4, 5).

He that doeth good is of God; but he that doeth evil hath not seen God (*3 John* i, 11).

Thou sayest I am rich [and increased with goods and have need of nothing] and knowest not that thou art wretched, and miserable, and poor, and blind, and naked (*Rev.* iii, 17, 18).

MALEBRANCHE *De Veritate*.

The least appearances of truths have more efficacy upon men's minds in matters of faith, than real truths in matters of physics or metaphysics, for which subjects the commonalty of mankind care little (*IV*, vi [p. 268; 1 *Eng.* 40] See *Truth*).

God addresses the mind and obliges it to believe, in two ways, namely, by evidence and by faith (*Explica ad Lib.* I et V [p. 31; 2 *Eng.* 396]). Faith from hearing [*ib.* p. 31; 2 *Eng.* 399].

[SACRED SCRIPTURE.*]

John the Baptist on good works (*Matth.* ch. iii, 8, 10); Christ (*Matth.* v, 7, and ch. vii, 16-28).

The Son of Man shall come in the glory of His Father, with His angels, and then He shall reward every man according to his deeds [*Matth.* xvi, 27; 2 *Cor.* v, 10].

Though I be endowed with all faith so that I could remove mountains, and yet am not endowed with charity, I am nothing, etc. (1 *Cor.* xiii, 2, 3).

In Christ is faith working by charity (*Galat.* v, 6).

WILL, HEART.

[Page 25]

ANDR. RYDELIUS, Doct.

There is a great dispute with regard to the terms intellect and will.† The will is also called the heart, inasmuch as the will embraces all the inclinations and affections of the heart. By the heart is especially meant the dominant inclination. To the will pertains not truth, but good. Will I define as inclination together with determination.

AUGUSTINE.

For it is an eternal law which he has established with unchangeable firmness, that in will there is merit, and in blessedness and misery, reward and punishment. When we say that by will men

* Castellio's version.

† See above, p. 13.

are in misery, we do not necessarily mean that they wish to be in misery, but that they are in a will which is necessarily followed by misery, even when they themselves are unwilling (*De lib. Arbit.* c. xiv [I, 244AB]).

Will is an emotion of the mind, in the absence of extraneous force, directed either to the not losing of something, or to the acquiring of something (*De duabus Animabus*, c. x [VI 36C]).

ARISTOTLE.

Will is appetite. When one is moved by reason, he is also moved by will. But appetite may move a man in the absence of reason, for cupidity is a species of appetite. [The intellect is always right, but appetite and imagination may be right or wrong. Therefore it is always appetency that moves man.] But this is either good, or what seems to be good; [not all good, however, but that which comes under the head of action*]. Good comes under the head of action, when it might also be differently circumstanced. . . . Reason and cupidity are opposing appetites. . . . That which moves organically, is found at the point where is the beginning and the end. . . . By nature the superior faculty is always more powerful, and is that which moves (*De Anima* L. III, c. xi; [II, 56ABE, 57C; Hicks, Ch. 10, 11, pp. 151-5]).

PLATO.

Will is defined as desire with right reason, appetency consentaneous with reason, appetency with reason according to nature (*Definit.* [III] p. 413 [C; 6 Eng. 133]).

MALEBRANCHE *De Veritate*.

By Will I understand that impression or motion whereby we are led to an undetermined and universal good (L. I, [C. ii, p. 5; 1 Eng. 7]).

WOLFF [*Psychologia Rationalis*].

Will is said to be most perfect when it appetises only what is best (*Psych. Rat.* § 650).

Rational appetite or volition is an endeavor to produce a foreseen perception, in that it is determined by a distinct notion

* Instead of "good which comes under the head of action" a better rendering of the original Greek would be "practical good."

of the good which coheres with that perception (§ 517). Rational aversion or nolition* is the endeavor to hinder a foreseen perception, in that it is determined by a distinct notion of the evil which adheres to the same (§ 518). Appetite and rational aversion, or will and non-will, do not exceed the force representative of the universe (§ 519). By its essence and nature, the soul appetises good and is averse to evil (§ 520); and it wills good, and by no positive act does it will evil (§ 521). Every individual soul contains a series of perceptions and appetitions, and also of aversions, different from the series of any other soul (§ 524). The soul's liberty is independent of the mode whereby it arrives at its sensations, or of the dependence of sen-
[Page 26]

sations upon the body (§ 526). Liberty flows into a series of perceptions, or it concurs to their determination (§ 527).

LEIBNITZ *Theodicea*.

In a general sense it may be said that Will consists in the inclination to do something because of the measure of good which it contains. This Will is called *antecedent* when it regards individual goods separately, as to how far they are good. In this sense it may be said, that God tends to all good, as far as it is good, or to use the words of the Schoolmen, that He tends to a "perfection simply simple" and this by antecedent will. . . . [This will can hardly progress to the utmost of its endeavor otherwise it would always produce its full effect, since God is the Lord of all things.] An entire and infallible event therefore belongs only to consequent will, as it is called (§ 22 [p. 606-7]).

The *consequent will* of God, which has sin for an object, is only permissive (§ 25 [p. 611-2]).

Will is never brought to action except by the representation of a good prevailing over contrary representations. That this is the case with God, good angels, and the minds of the blessed, is confessedly true; nor do we therefore any the less acknowledge them to be free (§ 45 [p. 645-6]).

Primitive antecedent will has for its object every good and every evil *in se*, separated from every combination; and it tends to the

* (Non-volition.)

promotion of the good, and the prohibition of the evil. *Mediate will* goes into combinations; to wit, when some good is attached to an evil, the will tends somewhat to that combination when the good is more potent than the evil. But *final and decreeing will* results from the consideration and total combination of all the goods and all the evils that enter into our deliberation. From this it is clear, that though mediate will, may in a manner be called consequent in respect to the pure and primitive will, yet, in respect to the final and decreeing will, it may be considered as antecedent (n. 119 [p. 773-4]).

As regards velleities,* these are only a very imperfect kind of conditional will. I would if I could; it would be free if allowed; and when we have velleity of this kind, our will is not so much to will as to be able. Hence in God there are no velleities,—which must not be confused with antecedent wills (§ 404 [p. 1194]).

Some think that the will determines itself according to the final judgment of the intellect. According to this opinion, the will is held to be disturbed in its own right, and the soul is made fundamentally passive (*Annot. in Lib. De orig. Mali.*†) (§ 13 [p. 1299]).

The will is divided into two parts, the one being antecedent or consequent and the other productive or permissive. The first division is, that the will may be either antecedent or previous, or consequent or final; or what is the same thing, that it may be either inclinatory or decretory; the former is incomplete, the latter is complete or absolute [*Caus. Dei Assert. per Justit. ejus*‡] (§ 23, 24, [p. 1366]). Consequent will arises from the concurrence of all the antecedent wills; to wit, that, when the effects of all these latter cannot stand together, there may be obtained by wisdom and power, the utmost possible effect. This will may also be called a decree (§ 26 *Caus. Dei per Justit.* [p. 1367]).

* A word used by the philosophers to signify actual wishing or willing.

† This is Leibnitz's commentary on a work by Bishop William King,

‡ The full title of this work is: The Cause of God asserted by His

The Latin is *velleitas*.

entitled *De Origine Mali*, London, 1702.

justice reconciled with His other Perfections and all His Actions.

(To be continued.)

THE BRAIN.

BY EMANUEL SWEDENBORG.

(Continued.)

221. 90. By its hydras, or bendings like those of serpents, the active cerebrum so applies itself to the sides of the falx and to the transverse septum, that it is able to attract every least transient cord, or every point of both septa. Nevertheless the common determination of all the parts is towards the torcular Herophili or fourth sinus, where the longitudinal and latitudinal sinuses come together. To this point look all the lobes rising on either side; also, all the circumflexed tumuli in the lobes; and likewise the dura mater. The latter, moreover, gathers together in the occipital tuberosity, the extremities of its four processes. There also it descends towards the pineal gland, that from this point it may regard the other extremity of its axis, and, interiorly, by means of the infundibulum, the sella of the pituitary gland. To this point the great artery of the dura mater,* that is, the large middle branch thereof, and also its second or inferior branch, are plainly determined and insinuated; as are likewise the arteries running through the gross meninx of the cerebellum. Therefore this centre is occupied by the strongest fibres, lacerti and nodes, which, from this point, strive to emerge into the hemispheres in every direction. "Within the cavities of the sinuses, both of the cerebrum and cerebellum (says Willis) are found many fibres, or large cords, as it were; and it may be suspected that these robust and ligamentous fibres, which are of a like nature with those found variously extended in the ventricles of the heart, sometimes contract and sometimes dilate and variously open up the membrane in which they are inwoven" [*De Cerebro* VI.] On this side, there-

* The middle meningeal artery, which is the largest of the branches given off by the internal maxillary.

For a description of this artery see
1 *Brain*, 214.

fore, there is here a genuine termination,—the goal of the whole cerebrum, and the aim of its particular motions. In brute animals which run swiftly and with prone head, a triangular bone is here deeply inserted as a protection;* moreover, as was observed in one particular subject, when the dura mater was loosened from its connection with the cranium, it gathered the whole mass of the cerebrum mainly to this point. Therefore, under the auspices of this common determination are the particular determinations which press the sides of the septa and sinuses. Hence the fibres of the dura mater, with the ends of the lacerti springing therefrom, curve upwards; and, from the origin of the falx, these fibres, with the finer and shorter lacerti, curve downwards; while the intermediate fibres seem inclined to take a straighter course, but still in the same direction. This direction of the fibres clearly reveals the direction whither the stream of the motion flows; for the highly delicate stamens of the embryo, when growing lengthwise and breadthwise, acquire fibres with no other direction than that in which the primitive fibres were most constantly extended.

222. 91. From the above particulars thus presented before us, we may be allowed to make our induction, and, at the same time, take a view of the dura mater towards the whole of the coronal suture, through which vessels and tendons springing from its texture are transmitted. For when the mater is stretched, by the expansion of the cerebrum, the tension is directed to this place both in general and in particular, this being the point to which the fibres bend, and which is regarded by the ends of the lacerti. Moreover, the mater yields to the force of the active cerebrum, inasmuch as under the two parietal bones it is loosely applied to the cranium. Thus, the blood and juice is expelled from the arteries and fibres of the membrane into the cranium and external periostia, by the same action that expels it from the pia meninx into the sinuses. As regards the juice in the membrane, the fact that it exists in great abundance is clear from squeezing; for when the membrane is squeezed, a dew sweats out from innumerable pores, and its layers are moistened, and

* In the dog, fox, cat, horse, and other animals a bony partition, called the triangular bone, is found

inserted between the cerebrum and cerebellum.

this even when it is pressed a second time, after being wiped dry. And since the mater looks to this point from both sides, it becomes clear why the anterior set of fibres does not communicate with the posterior set.

223. 92. A like reasoning obtains in regard to the direction of the fibres springing from the transverse septum towards the lamboidal suture; and also in every other place where the arteries of the dura mater pass out. Thus each of the fibres rules its own tendon and vessel, and dispenses the liquid thereof, that it may be sent off either to the cranial substance and the diploe, or beyond. This is the reason why the principal artery of the dura mater goes off into three branches, the middle or straight branch going to the posterior part of the falx, the upper to its anterior part, and the lower to the transverse septum; and why each of these branches communicates with the other, with the result that all the exits, howsoever many, are open to each single drop; and each little vessel furnishes a common path for all,—a path which is open to them if other passages are denied. To this end also, the membrane, except in certain places, is devoid of veins; for no passage is permitted from veins to arteries, such as exists from one artery to its neighbors.

224. 93. There is, nevertheless, a certain action proper to the dura mater, arising from the pulsation of its arteries; for with the simultaneous elevation of the latter, the mater must necessarily be in some way contracted. The sphere of this activity, however, does not extend to the septa, and still less to the beginnings of the nerves and thence to the provinces of the subjacent body. Still by virtue of its elasticity, it adds this force, which it stimulates and renews by its alternations. Its arteries vibrate according to the systole and diastole of the heart, and of the arteries of the body, face, sinciput, occiput, temples, with which they are in direct communication. But because the cerebrum inspires and expires with the lungs, a point which will come to be demonstrated, therefore the pulsations of its arteries are not synchronously coincident with those of the dura mater. For this reason the dura mater does not draw its blood from the arteries of the cerebrum, but from the external carotids through

the two foramina cut in the sphenoid bone, and near the orbits;* and also, according to Ridley† through the foramina where the jugular veins have their exit, and, moreover, in the portals where the internal carotid and vertebral arteries have their entrance, before being wedded and inosculated with their cerebrum and medulla oblongata. Nor do its little arteries venture to slip directly into the sinuses by apertures; but when the contraction, with its moments, comes thus far, they first insinuate themselves into the branches of the pia mater extended to the dura, and form little veins, concealed under the arteries and from which the blood cannot return into the arteries,—according to the experience of Winslow.‡ This pulsation of the arteries of the dura mater, which is synchronous with that of the arteries of the heart, or of the branches of the external carotid, is felt by the fingers when the fontanelle, or fons pulsabilis of the infant, is touched; for there the arterial lamina of the dura mater, that is, its superior lamina, is almost alone, and the pulsation of all the arteries of the membrane, being there concentrated as it were, is rendered sensible; especially in view of the fact that the streams running through it are quite small, namely two somewhat larger ones running lengthwise and occupying this middle diameter of the meninx like little trunks, and many lateral branches flowing into them; see Ruysch's tables.§ But whether, and when, the underlying sinus has a pulsation, which is felt as being emulous of the heart, will be enquired into below.

225. 94. From the above points when duly weighed, it will be clearly evident, how wise is the dispensation and communication of the blood in the two bodies, so mutually connected together, and yet, in respect of the blood, so diversely moved. For were they to make synchronous alternations, the internal carotids would administer blood to both the bodies, and the sinuses of both would draw it off; and not the least drop of dew would be

* *Orbitas*. The foramen referred to is the foramen spinosum situated between the foramen ovale and the temporal border of the sphenoid bone.

† *Anat. Cer. C. III*, p. 23.

‡ *Expos. Anat.* sect. x, 435–37.

§ *Thesaurus Anat. V.*, Tab. ii, fig. 4.

transmitted through the sutures. As a result, the substances of the cranium would not be nourished from the side, nor would the mater observe its pristine relationship with the external pericranium; for it would be consentient with that arterial stream which flows on the outside, and which the windings join together in an infinitude of places in the cranium, its cavities and sinuses. Thus from the arterial stream of the dura mater, a liquor can always be distilled to moisten the fibres that are in continual friction. Of this liquor, moreover, there is frequently a large collection; for we are justified in believing that this is the source of that flooding of the brain which occurs in hydrocephalic and other subjects. This is especially evident, in view of the fact that only a little of this liquor is taken up by the veins, and the latter seem to be derived, not by the sutures into the cranium, but rather into the sinuses and the septa. Moreover, the state of the arteries of the dura mater seems to be almost exempt from the restless state of the cerebrum; for these arteries keep near the superior lamina, and this is not furnished with visible fibres or directions of fibres as — — —

(here one leaf, or two pages, is missing from the manuscript).

227. 96. — [maters] of the cerebrum, which are maters of the other [parts] seem to be formed entirely for the reception of modes; since the fluids, like their active and highly elastic forces, transfer these modes from the extreme organs to the cerebrum,—in very much the same way as the fluids or auras of the world transfer them to the first recipient organs. That there are degrees of their modes or modifications, is admitted. In one degree are those modes which cleave the air or ultimate aura, and strike the organs of hearing; modes which are then called sounds. In another degree are those which flash through the ether, even in the absence of air,—as in the bell glass of an air pump,—and strike the eyes, when they are called sight. In a still higher degree are those modifications which immediately run through the internal organs. For there are like gradations, not only in organs, meninges, fibres and fluids, but also in the auras of the world, and in the modifications and forces, and in all the affections of substances of this kind. In order therefore that all things may be adapted to their own degrees, the ultimate and grossest modes,

which are also called modulations, and modulamina, and tremiscences, are taken up by the ultimate and grossest membrane of the cerebrum; and they are carried thither, not only by the fibres and fascicles of the hard portion of the auditory nerve, but also by the whole texture of the cranium. For this texture is cavernous, full of pores, and closely beset with periostia and expanded membranes and also with fluids of the same degree, that is to say, with all the means that are best adapted for the reception and transmission of oscillations of this kind. Hence sound is transmitted to the dura mater, not only by the tympanum, its membranous production emulous of the dura mater, and by the fenestrae and cochleae of the labyrinth, but also by other ways; and, as is well known to children, it is carried directly from the teeth, the jaws, and the bones of the sinciput, temples and occiput, when these are touched. No other membrane receives this sound in the first place, except this general and outmost mater, which moreover, is extremely sensitive. This likewise is the reason why the single nerve serving the sense of hearing, is partly hard and partly soft, and why the hard portion also ascends to the gross meninx. This membrane, however, being a single membrane, is not able to discern the modulations; nor do distinct degrees appear in this membrane as in the cortical substances, each single degree of which is highly distinguished into its series and differences. Hence, by the mediation of this mater, these grosser modes, transferred to the cortical substances, are received in a general mode; and in them, are thus distinguished the differences of tones or sounds, or of harmony and disharmony. Hence modulations and harmonies cheer and exhilarate the mind, opening it when sad, and soothing it when clouded.

228. 97. Here we meet with something that is worthy of most careful note, namely, that in the whole of nature, there is never a distinct particular, but what receives that characteristic from its general or universal; thus, that wheresoever the one is found, there necessarily, is found the other corresponding to it; under whose auspices, as it were, the particular exists; or to which it owes the reason of its distinctions. This is at once evident in the tremiscences of sound, of which we now treat. Unless the cranium were thus cavernous, and especially its temporal

and petrous region wherein are ensculptured the organs of hearing; and unless to this cranium, with its numerous pores, were bound a membrane holding the place of a periosteum, it would be hopeless to perceive any difference of sound, nor would the tremefaction of the air be rendered audible. Or, what comes to the same thing, it would be hopeless to distinctly perceive the modulations running through the fibres of the soft portion of the auditory nerve, without the application of the hard portion of that nerve. The case is not unlike as with musical instruments. These would give no distinct audible sound, unless they were possessed of a tremulous body, to which by a bridge, were attached strings whose vibrations are elevated according to the common tremiscence of the body; under which tremiscence they are distinctly perceived. The like reasoning applies to the ether. No image, color or motion would be distinctly seen by means of the ether, but all things would lie hidden under dense shade as it were, unless by means of the sun, there coexisted that general modification which is called light. So likewise, nothing is distinctly perceived in the internal organs, without some general knowledge; but particular ideas remain in the shade, just so far as the general knowledge under whose intuition, as it were, they exist, does not shine upon them to give light. In all cases, therefore, the corresponding universal must be present, if an inferior general or universal is to be distinctly perceived. And the general must be present, if the special is to be perceived; and the special if the particular, and the particular if the individual. Therefore, from a knowledge of that which is more universal, we can know what the perception of particulars is, whether distinct or obscure.

229. From this, therefore, we have a glimpse, as through a lattice work, of the use that will be served by a Philosophy of universals, of degrees, or of things mathematically indefinite. For universal perception lies in the soul herself, on whose organs must be impressed by degrees, those things which come under her universal light for distinct examination. If we once strive in this direction, to the end that we may be allowed to speak from causes and true principles, then an easy passage will be granted us

to all singulars. For from the universal* the mind will then simultaneously comprehend infinite particulars; from a centre, as it were, she will behold the whole of the periphery, and at one glance will run through all that is carried on in the radii round about. She would be in her own Olympus, as it were, ready at a glance to run through all the fields beneath her, both simultaneously and successively. Thus looking from on high, and running through all her boundaries in a moment, she will perhaps laugh because she had so long wandered in particulars and inferiors, and by reason of interjected shadows, as it were, had not been able to extend the gaze of her eye beyond nearby objects.

230. 98. What has now been said respecting the distinction of particulars under a universal guidance and light is true not only of modifications and sensations, but also of motions, forces and substances; and, moreover, of resistances, the last of which, in the animate cerebrum, lies in the dura mater. To this mater, as an aid in these resistances, is added the cranium, to which therefore, in its own proper places, it must be closely attached.

III.

THE FIRST SINUS OF THE DURA MATER.

[Paragraphs 99–100 contain excerpts from the anatomists.]

233. 101. In a day so illustrious as the present, when experiments are instituted for the investigation of a single blood cavity, there is no excuse for our wandering in darkness, and seeking causes by wide enquiry and conjecture. Causes offer themselves to our view spontaneously; and when all things speak with one voice and one testimony, their words cannot be called answers from some dark cavern. From all the particulars taken together, that is, from the whole of them, reason is able to declare:

I. *That the cerebrum acts upon this sinus mediately by means of the falx and dura mater. That is to say, when the cerebrum constricts, it expands the sinus; and, when, on the other hand,*

* The MS. has "particular" "universal" or "general." which seems to be a mistake for

the cerebrum expands, it constricts the sinus by stretching it lengthwise and drawing it open breadthwise. But this is done in such way that in the state of the cerebrum's expansion, the sinus is produced lengthwise and drawn downwards, so that in respect of its breadth also it is closed; but in the state of the cerebrum's constriction, the sinus is contracted in respect of its length, and drawn open in respect of its breadth, and is thus opened in respect of both dimensions.

II. That the sinus, when once expanded, from its own force of elasticity, strives to constrict by means of cords, membranous expansions, and muscular glands; and again, with the urging of the blood in general and in particular, it strives to expand. Thus in the sinus there is a relation of reaction in respect to the action of the cerebrum and falx. This may be compared with the heart, for the blood flows through this sinus before it flows through the heart; thus these windings urge the sinus to open.

III. And that at the same time it closes its aurifices, covers them with valves, and together with the cerebrum, the processes, the dura mater, and their added forces, expels the blood into the lateral sinuses.

IV. In general, that every cavity of the whole cerebrum, whether it be without or within its structure, that is to say, whether it be a sinus, a vein, an artery, a ventricle, a fissure, or an interstice between the cortical substances, or also between the medullary substances, coalesces and closes at the time of the cerebrum's expansion; and the reverse.

V. Moreover, that in the state of its expansion, that is, of the cerebrum's expansion, the substance of the cortex imbibes the purer blood; but in the state of its compression it expels this blood into the medullary and nervous fibres all the way to their ultimate terminations in its kingdom.

VI. Consequently that the fibres themselves, with the larger channels, sinuses and cavities of the whole cerebrum, are opened and closed at the same moments.

VII. And that this effect is not a successive effect, like the progress of the blood in the body from the arteries to the veins, but is simultaneous in all the parts; but the amount of the expansion increases successively by degrees.

234. 102. That by means of the falx and dura mater, the cerebrum expands the longitudinal sinus and then contracts it, is clear to some extent from what was said above respecting the dura mater; for the sinus is held enclosed in the duplicature of the mater, whose upper layer constitutes its roof immediately under the cranium and whose lower layer constitutes its lateral walls which soon coalesce into the falx. Hence the enclosed sinus is ruled according to the guiding force of the falx and dura mater, and the falx is ruled according to the force of the cerebrum, exerted upon itself and the transverse septum; for what is mediate and enclosed suffers itself to be acted upon by the things surrounding it and closing it about.- The same conclusion is deduced by Ridley from experience. It is likewise a consequence of the assertions in the preceding article. When the cerebrum expands, and when the cerebellum lies swollen under the horizontal septum and on the opposite side, the falx is stretched from the front to the base, and with the falx, both the lateral parts of the sinus; by reason of this, and also with the extension of the cerebrum, this sinus is stretched lengthwise. At the same time the cerebrum is incumbent on the sides of the sinus, and slightly relaxes all that connection which the sinus, by means of the falx and dura mater, has established with the pia meninx, and with the veins thereof which pass into the dura and the falx. Hence at the same moment there is afforded to the falx an opportunity of drawing itself downward; and this is effected also by the mediation of the transverse septum, and likewise, if there be no fibrous substances between the falx and the corpus callosum, by means of the underlying corpus callosum, and of that prominent branch of the carotid artery which is reflected from the front, and after bifurcation, runs through the dorsum of the corpus callosum.* For at the moment of the cerebrum's expansion, the corpus callosum, together with the artery implanted therein, is stretched lengthwise and drawn downwards, on which subject we speak elsewhere. Hence the intervening and interlacing fibres seem to draw down the inferior limb of the falx which is almost free, not to speak of other adscititious forces of the same determination,

* The anterior cerebral artery.

which produce their effect when the cerebrum unfolds itself above, and enfolds itself below, between the hemispheres, and this being the action also of the anterior ventricles and of the oval medullary space. By reason of this, the sinus, from being a cylindrical cavity, namely, when it is swollen because filled with blood, is stretched and drawn into a prismatic cavity; or, if you prefer, from being a conical cavity it is drawn into a cavity shaped like a triangle. Hence a furrow or delicate cleft runs through both its upper wall and its base, that it may sketch a delineated vestige of the figure which it received by reason of its alternations. Thus its capacity is diminished, as when a cylinder is pressed into a prism or a globe into a trigon, and likewise as when a membranous or farciminal tube is stretched lengthwise.

235. 103. Hence then it comes to pass that the membranous expansions, folds, *valvulae conniventes* and anfractuosities, pass from the base in greater size and abundance when the sinus is curved, and from the side to the fundus and from the fundus to the opposite side transversely and in an oblique direction and also criss-cross; and that interstices and expansive cavities come to view. For there are similar ridges and anfractuosities in the cavities of all the other members, as in the heart, stomach and intestines, the alternate constrictions and expansions whereof are not unknown to us.

236. 104. The cords of Willis, whether many or few, and whether thrown across to the opposite side of the sinus or obliquely through the sinus towards the fundus, to say nothing of the folds,—all testifying to the same conclusion,—produce the effect that the walls approximate to each other. So likewise the reticular processes in which the cords end; for at the moment of being drawn outwards and downwards, they are expanded by means of the tunic, and act upon the cords or upon the texture thus compacted and close woven, so that they mutually coalesce with the sides.

237. 105. It is a matter established, I think, by examination, that the longitudinal sinus is expanded and contracted by means of the cerebrum; but since its own texture contributes likewise to the same result, and this texture is entirely different from that of the veins of the body, and seems rather to approach to that of the heart, we must further declare:

- I. *In what way its expansion is effected.*
- II. *In what way its contraction.*
- III. *In what way the blood is derived into it.*
- IV. *And in what way is effected the expulsion of the blood from it into the lateral sinuses.*
- V. *Also, what is the difference between this venous sinus and the veins of the body.*
- VI. *What is the likeness and relationship between its structure and that of the heart.*
- VII. *And finally, the expanding and constricting forces of the cerebrum must be compared together.*

All these points follow as consequences from the assumed action of the cerebrum upon the sinus, and also from its clearly seen connections with the dura mater, the falx and the other neighboring parts; and likewise from the texture of the sinus itself.

238. 106. [I] *In what way the expansion of the sinus is effected.* From our premises it seems possible to draw some conclusion as to this matter, to wit, that this expansion is effected by the recession of the cerebrum and by its simultaneous action upon the lacertous fibres and intermediate excrescences, with the resultant drawing together of the two sides of the enclosed sinus; at which moment also the lower portion of the falx, is restored to its own liberty. This latter seems to be capable of both elevation and abbreviation; that is to say, of elevation when the great fissure of the cerebrum, which lies between the hemispheres, is drawn slightly downwards and yawns open above, the corpus callosum being simultaneously elevated, the branch of the reflected carotid, of which we spoke above, becoming swollen, and the lowest part of the fissure evolving from within; and of *abbreviation* when the cerebrum, receding from its transverse septum relaxes the falx, which also it gradually draws up from the crista galli. Consequently the intercepted sinus seems to be drawn apart, opened and amplified by forces acting upon it from without,—such being the connection of all the parts. The interior lacertous fibres of the sinus communicate with its exterior fibres, these with the dura mater, and both with the pia mater, by means whereof they communicate with the cerebrum. The same is also the case with

the muscular granules, which, according to Pacchioni, are scattered in the interior; they turn their little backs towards the cavity of the sinus, but their lymphatics, as he avers, they transmit to the pia maters and in the direction of the dura. Add to this, that there are numerous intervening tendinous fibres, membranes and vessels which cause the sinus to be wholly opened when the cerebrum recedes or withdraws into itself.

239. It is apparent, therefore, that the sinus is drawn open by an external and violent force and not by blood injected by a certain force,—of which matter we shall speak below. From this external force, thus drawing the sinus open, it also follows as an effect that the cords of Willis are stretched all the way from wall to wall, so that they seem desirous of gradually preventing, by their force of reaction, any further drawing apart of the sinus; for it is their office to hold the cavity within prescribed bounds of dilation, and at the same time to interiorly contract every tunic belonging to the sinus. A marvellous extension and enrooting of these cords comes to view; for they are stretched obliquely and at the same time transversely from the lower part of one wall to the upper part of the opposite wall, and the reverse; and they are so enrooted among the fibres, that they are composed of many fibres stretched around them and constituting the netlike structure of a quasi tunic,—which fibres, seem to gather themselves into the cords when the sinus is expanded, and then to leave the cords and betake themselves to the tunic, that is, to their origins, when, by an external force, it is contracted and loosened in respect of both its terminations. The disposition of the falx, and the communication of all the parts, appear to be such that, although the sinus is violently pressed,—it being an external force whereby it is opened,—yet it expands at the least force acting from without; for there is a ready expansion of the cords when the sinus is relaxed, and liberty afforded to the fibres which are interiorly contracted and merged into the cords. What acts upon the roots acts also upon the tunic and the cords. Moreover, there is the coming in of blood which fills up the sinus.

240. 107. From the above it is now clear what is the cause of the constriction of this sinus; for from the causes that expand, are known the causes that contract. Now, since this venous

cavity is filled with blood, there is required for its constriction not only an external force, but also an internal, that is, a force proper to the sinus itself; and such force is seen to be at hand in the cords of Willis, and consequently in that whole tunic which comes into existence as soon as the falx and sinus are produced lengthwise and drawn downwards. Hence the external force of the cerebrum produces the internal force. As regards the *external* force, the tumescing cerebrum is incumbent upon the walls, and at the same time upon the transverse septum; hence the falx, together with the sinus, is pressed together and drawn out in respect to length, and at the same time is drawn downwards. As regards the *internal* force; the cords are now tense, and they contract the tunic in which they are enrooted, into anfractuosities or folds, which desire to be unfolded when the sinus is produced lengthwise and drawn downwards; hence the cords would betake themselves into the tunic, which is thus in a strong endeavor to collapse.

(To be continued.)

THE NEW PHILOSOPHY

Vol. XXIV APRIL-JULY-OCTOBER, 1921 Nos. 2, 3 and 4.

TRANSACTIONS OF THE TWENTY-FOURTH ANNUAL MEETING OF THE SWEDENBORG SCIENTIFIC ASSOCIATION.

The twenty-fourth annual meeting of the SWEDENBORG SCIENTIFIC ASSOCIATION was held in Bryn Athyn, Pennsylvania, on Friday, May 27, 1921.

AFTERNOON SESSION.

The meeting was called to order in the Assembly Room of de Charm's Hall at 4 o'clock p.m., the Rev. L. F. Hite presiding. Twenty-two members and eight visitors were present.

The minutes of the twenty-third annual meeting were read and approved. The Treasurer's report was then read, including a summary of the work of the Association from 1900 to 1921.

An interesting discussion followed as to ways and means of increasing the financial stability of the Association. The following suggestions were made:

1. The possibility of printing material in the Bryn Athyn Print Shop.
2. Obtaining a number of estimates for the cost of printing the NEW PHILOSOPHY.
3. Financial drive through the medium of a representative in the different centers of the Church.

Upon motion, duly made and seconded, the Treasurer's report was accepted and ordered filed.

The President then appointed Messrs. W. B. Caldwell and Raymond Cranch as Auditors.

The report of the Editor of the NEW PHILOSOPHY was then read. It was moved that the report be received, and that a discussion of both reports be continued at the evening meeting. *Carried.*

The Chair appointed Messrs. L. E. Gyllenhaal and Raymond Cranch to act as nominating committee.

The Secretary then read a paper entitled "Series and Degrees," by the Rev. John Whitehead. A short discussion followed, in which the value of the study of Swedenborg's Philosophical works as basis for a more complete understanding of the Writings was pointed out.

The committee on nominations then reported as follows: For President, the Rev. Lewis F. Hite; for Board of Directors, Dr. F. A. Boericke, the Rev. John Whitehead, Professor Alfred Acton, Professor C. E. Doering, Mr. B. A. Whittemore, Mr. W. Howard.

The Secretary was instructed to cast the ballot for the above nominees as officers of the Association, whereupon they were duly declared elected.

The meeting then adjourned at 6 o'clock, to meet at 8 o'clock in the Auditorium.

EVENING SESSION.

The meeting reassembled at 8 o'clock in the Auditorium of de Charm's Hall, 106 persons being present.

The President then read his address on the subject of "Swedenborg's Physics." Owing to the crowded nature of the program, no time was given for discussion.

The President announced that the next order of business would be a continuation of the discussion of the reports of the Treasurer and Editor of the NEW PHILOSOPHY. He called on Mr. C. E. Doering to open the discussion.

Mr. Doering, armed with a collection of the books published by the Association, gave an historical review of the work of the Association, and forcefully pointing out the uses actually performed in the past, called attention to the present financial need for the carrying on of the work.

Mr. Acton seconded the remarks of Mr. Doering and pointed out that it would be impossible to continue the publication of the NEW PHILOSOPHY unless financial assistance were immediately forthcoming. He spoke of the necessity of printing, as soon as possible, fifty-seven pages of the Philosopher's Notebook and seventy-five pages of the work on the Brain, all of which are now in type. Five hundred copies of each should be printed at once, which will cost about four hundred dollars. Another four hundred at least is necessary to insure the publication of the NEW PHILOSOPHY for the coming year. Mr. Acton concluded with a strong appeal to all members of the Association to realize more fully their obligation to the Association and its uses.

Mr. Doering then moved the following resolution, which was seconded by Mr. Acton and carried unanimously:

Whereas this Association has received contributions from Mr. C. W. Barron and Dr. F. A. Boericke, in an amount making it possible for the Association to publish the work "Psychological Transactions,"

Now, therefore, be it *resolved* that this Association hereby express its appreciation to these gentlemen for their generous contributions.

And be it further *resolved* that a copy of this resolution be sent to each of the donors.

An interesting address was then given by Professor Acton on the "Origin of Man."

The address was in the nature of a consideration and discussion of the four following theories:

1. The Fiat theory.
2. The Protoplasmic or Evolutionary theory.
3. Creation through the medium of the animal kingdom.
4. The Worship and Love of God theory, namely, the birth of man by means of the impregnation of ova through the vegetable kingdom.

The address was enthusiastically received. Unfortunately the lateness of the hour prevented any discussion and the meeting adjourned at 10:15 p.m.

WILFRED HOWARD,
Secretary.

REPORT OF BOARD OF DIRECTORS.

Since the last annual meeting the Board of Directors have held three meetings.

At a meeting held on May 29, 1920, the following officers were elected:

Vice-President, Dr. F. A. Boericke.

Treasurer, Mr. C. E. Doering.

Editor of New Philosophy and Literary Editor of the Association, Mr. Alfred Acton.

Secretary, Mr. W. Howard.

At a meeting held on April 14, 1921, the following subjects were discussed:

1. The increased cost of printing the NEW PHILOSOPHY and a suggested change of printers.
2. The need of an agent for the NEW PHILOSOPHY in England.
3. A fixed charge of 10/- per annum for the NEW PHILOSOPHY in England.
4. The time and place of the annual meetings.

At a meeting called on May 27, 1921, it was decided to print five hundred copies of the translated portions of the Philosopher's Notebook now in type, consisting of about fifty pages.

WILFRED HOWARD,

Secretary.

TREASURER'S REPORT.

FOR THE YEAR ENDING MAY 27, 1921.

Receipts.

Dues	\$238.73	
Subscriptions to NEW PHILOSOPHY.....	89.00	
Sale of publications.....	129.90	
Contributions	196.40	
		\$654.03
Balance on hand, May 29, 1920.....		507.38
		<hr/>
		\$1,161.41

Expenditures.

Printing and mailing 4 issues NEW PHI-	
LOSOPHY, Apl., 1920-Jan., 1921.....	\$400.01
Cover paper for NEW PHILOSOPHY.....	30.58
	<hr/>
	\$430.59
Publishing PSYCHOLOGICAL TRANSACTIONS.....	591.93
Books bought at half price.....	13.94
Stationery, postage, etc.....	39.46
	<hr/>
	\$1,075.92
Balance on hand, May 27, 1921.....	85.49
	<hr/>
	<u>\$1,161.41</u>
Balance includes Royal Academy publications.....	\$10.00
Dues unpaid, 1921.....	91.50
Subscriptions unpaid, 1921.....	34.50
Dues unpaid, 1920.....	18.00
Subscriptions unpaid, 1920.....	12.00
Dues unpaid, 1919.....	3.00
Subscriptions unpaid, 1919.....	1.50
	<hr/>
	\$160.50
3 in arrears for 3 years, dues and subscriptions....	15.00
18 in arrears for 2 years, dues and subscriptions..	58.50
45 in arrears for 1 year, dues and subscriptions....	87.00
	<hr/>
66 owe dues and subscriptions.....	\$160.50

Respectfully submitted,

C. E. DOERING,
Treasurer.

Audited and found correct:

W. B. CALDWELL,
RAYMOND CRANCH.

Membership.

Total net membership, May 29, 1920.....	187
New members.....	27
	<hr/>
	214
Resigned	4
Lapsed	3
Died	1
	<hr/>
	8
	<hr/>
Net membership, May 27, 1921.....	206

The number of paid subscribers to the NEW PHILOSOPHY is 214, of which number 202 receive it at half price, and 12, who are not members of the Association, pay in full.

SUMMARY OF WORK, 1900-1921.

In addition to presenting the report of receipts and expenses for the current year, I wish to make a résumé of the business the Association has done since 1900.

Receipts.

Dues	\$4,102.04
Subscriptions	2,731.90
General Contributions.....	\$1,481.48
A. N. C. Contributions.....	300.00
Convention Contributions.....	300.00
Rotch Trustees Contributions.....	100.00
	<hr/>
	2,181.48
Advertising	66.00
Sale of Publications.....	863.84
Royal Swedish Academy collection.....	594.00
	<hr/>
	\$10,539.26

Expenditures.

New Philosophy.....	\$5,233.31
General Expense.....	1,056.17
Copying Manuscripts.....	549.48

De Sale.....	330.58
Summary of Principia.....	43.73
Fascicles	148.74
Flying Machine.....	6.75
Catalogues	34.05
Royal Swedish Academy.....	584.00
Senses	446.02
Fibre	852.86
Psychological Transactions.....	644.85
Reprints	64.20
Return Kingdom.....	281.63
Worship and Love of God.....	6.90
Books bought and resold.....	112.83
Advertising	8.87
Alfred H. Stroh.....	48.80
	<hr/>
	\$10,453.77
Balance	85.49
	<hr/>
	\$10,539.26

In addition to the works here listed, the Association has inspired other bodies and individuals to publish some of Swedenborg's scientific works, and a number of studies of his works.

Prior to the war we published the NEW PHILOSOPHY at a little over \$1.00 per page. Since then the price has continually increased so that the average for the twenty years is \$1.57 per page. The latest estimate given us is over double this amount, which would make the cost of NEW PHILOSOPHY more than our total receipts for dues and subscriptions.

As we cannot discontinue such an important work, the Association will have to increase its membership and subscribers. This would seem to be possible if all the members will take an active interest in the matter.

Respectfully submitted,

C. E. DOERING,
Treasurer.

REPORT
OF THE
EDITOR OF THE NEW PHILOSOPHY.

Since my last report three issues of the NEW PHILOSOPHY have been published, namely, July and April, 1920, and January, 1921. These three issues have included a total of 100 pages, making the average number of each issue a little over 33 pages, or one page in excess of the regular size.

The contents of these 100 pages comprise:

Transactions	11 pp.
Articles	38 pp.
The Brain.....	22 pp.
A Philosopher's Note Book.....	29 pp.

100 pp.

The April NEW PHILOSOPHY has not yet appeared, owing to the increase in the cost of publication, which is so great as to make it advisable that we take stock of our resources before incurring further indebtedness. This matter will, I presume, be presented before the Association by the Treasurer, but there is one phase of it which should more properly form a part of the present report. I refer to that phase which concerns the pages that are held at the printer's for reprint.

The policy of the Association in publishing translations of Swedenborg's philosophical works in the NEW PHILOSOPHY preparatory to their appearing in book form, has made it necessary to "hold over" an accumulating number of pages. Experience has shown that it is far preferable to hold these pages in type until the whole of a given work is completed. The work is translated from time to time as it appears, and it is necessary for the unifying of the translation that there shall be a final revision of the whole before printing. In the past the printers of the NEW PHILOSOPHY have held the type of the works published by the Association without any charge, but the printing firm has now been reorganized and we understand that they propose making a charge for all "left-over" matter,

in addition to the greatly increased charges for the *NEW PHILOSOPHY*.

At the present time we have standing in type for reprint in book form 57 pages of the *Philosopher's Note Book* and 75 pages of Swedenborg's first work on the Brain. In the case of the *Philosopher's Note Book*, it would be practical to print the pages in 16-page fascicles and hold these fascicles until the whole work has been printed. This will involve, of course, that we decide upon the number of copies to be printed. This, I say, is practical in the case of the *Philosopher's Note Book*, but I do not regard it as at all desirable. The work is being translated from a manuscript copy, and the translator has not the time to make his translation except as required for its appearance in the *NEW PHILOSOPHY*. It is manifest, therefore, that when the work is finished there should be an opportunity of harmonizing and unifying the whole work before printing. However, highly desirable as this is, it is not absolutely essential, and the *Philosopher's Note Book* could be printed in 16-page fascicles from time to time.

The same is not true, however, in regard to the work on the Brain. In the translation of this work, which is being made from the photolithographed manuscript, the translator has omitted the anatomical quotations which introduce each of the chapters. He has done this partly from necessity, as explained below, and partly in order to avoid filling the pages of the *NEW PHILOSOPHY* with mere anatomical excerpts. It was intended that these excerpts should be translated, set up in type and inserted in their proper places when the time comes for publishing the work in book form. If, then, we are to print this work in 16-page fascicles as it appears in the *NEW PHILOSOPHY*, it will be necessary to either include the anatomical excerpts in the pages of the *NEW PHILOSOPHY* or to print them separately from time to time, that they may appear in their proper places as the 16-page fascicles are printed; and to carry out this policy it will be necessary, in order to print the 75 pages of this work now standing in type, to translate and set up over 100 pages of anatomical quotations at a present cost of about \$3.00 a page, or \$300.00 in all.

It will be seen, therefore, that if we are to continue the policy of past years with regard to translating Swedenborg's philosophical works, it will be necessary for the Association to come to some decision with regard to these matters; and it will be further necessary, if the Association is to secure a permanent printing of the works already commenced, to find means to meet the greatly increased expenditure required. If this cannot be done, I do not see any other course, at any rate with regard to the work on the Brain, than to abandon the work and sacrifice the part that has already been translated.

With regard to the policy of not printing, in the *NEW PHILOSOPHY*, the anatomical quotations in this work on the Brain, this policy was forced upon me quite independent of any considerations as to whether or not it is advisable to print anatomical quotations in the pages of our journal. The photolithographed copy, from which the translation has been made, does not include the pages containing the anatomical excerpts, and it was, therefore, impossible to translate them. I had been in the hope that the Association would have been able to borrow from the *ROYAL ACADEMY OF SCIENCES*, of Stockholm, the copy of the whole manuscript, which was made by Miss GRETA EKELOF for the use of the Swedenborg Committee. Unfortunately, however, the *ROYAL ACADEMY* finally decided against making this loan. Since then, however, the situation is changed, for during my visit to Stockholm last summer I made a manuscript copy of all the pages in the manuscript, which were omitted by Dr. Tafel in the photolithographed volume. If, therefore, the Association now wishes to print in the *NEW PHILOSOPHY* the whole of the work without break—that is, including the anatomical quotations—this can be done.

Since I have referred to the visit to Europe which I made last summer, I may here add, as a matter of interest to the members of the Association, that during this visit I was able to secure, for the Library of the *ACADEMY OF THE NEW CHURCH*, a large number of scientific and philosophical works of Swedenborg's time, which will be of great value and even essential to the translation of the *BRAIN* and the *PHILOSOPHER'S NOTE BOOK*, and particularly of the latter work, where Swedenborg

quotes from several authors whose works are now extremely rare. It will be a matter of pleasure to the members of the Association to know that in the Library of the ACADEMY OF THE NEW CHURCH there is a special department containing works owned or used by Swedenborg or having a direct bearing upon his studies and writings. This collection is being increased from time to time, and even now it stands eminent among all the book collections of the world in its value to the translator and student of Swedenborg's philosophical writings.

In addition to the work of the NEW PHILOSOPHY, I have also to report that during the past year the Association has published PSYCHOLOGICAL TRANSACTIONS. This work contains a new translation of the small works published some fifty years ago under the title POSTHUMOUS TRACTS, and which now appear for the first time with an index. The greater part of the PSYCHOLOGICAL TRANSACTIONS had already been printed in the NEW PHILOSOPHY, but the printed book includes, in addition, an appendix to the HIEROGLYPHIC KEY, consisting of quotations from Swedenborg's philosophical works on the subject of Correspondences, and also a translation from the photolithographed manuscript of an hitherto unpublished work on CORRESPONDENCES AND REPRESENTATIONS. The expense of including these works in the PSYCHOLOGICAL TRANSACTIONS was defrayed by the Vice-President of the Association. Yet, so greatly has the cost of printing increased that, even with this generous help, it would not have been possible for the Association to publish the work had it not been assisted by a generous contribution of \$300.00 made by one of our members, Mr. Barron, of Boston.

PSYCHOLOGICAL TRANSACTIONS is the sixth major work published by the Association. The work of the Association has proceeded slowly but steadily, and while it would seem to be an almost hopeless task to undertake the publication of large works through the vehicle of a journal of 32 pages appearing four times a year, yet it is by this means that the Association, within a comparatively few years, has been enabled to publish several important works, some of them never before translated, and others entirely out of print. These works include:

De sale Communi.

Scientific and Philosophical Treatises.

The Senses.

The Fibre.

Psychological Transactions.

Miss Beekman's "The Return Kingdom of the Divine Proceeding."

Besides lesser publications such as:

Catalogue of Swedenborg's Library.

The Summary of the Principia.

The Flying Machine.

A Classified List of Swedenborg's Writings.

The Association is now facing a critical time in its history, but the lessons of the past justify us in taking courage to face the difficulties of the present. There is much and important work to be done; but it is necessary to realize that our difficulties are very great, and that it is required of us to exert ourselves in order to meet them. It would be well if each of our members realized his individual responsibility in this connection. Our membership of 206 is altogether inadequate to sustain, by the ordinary dues, the important uses which the Association has undertaken, and which, by the aid of generous gifts, it has thus far successively carried out. We need a larger membership, a wider support. Each one of our members can contribute to meeting this need if he will endeavor to interest others in the work of the SWEDENBORG SCIENTIFIC ASSOCIATION. Membership in this organization means more, a great deal more, than the desire to read and study the philosophical works of Emanuel Swedenborg. It means the desire to see these works published and thus made available to students, in order that there may be a fuller understanding of the heavenly doctrine of the New Church. The SWEDENBORG SCIENTIFIC ASSOCIATION stands as the only body in the world devoted to this use and it should receive the support of all who are interested in promoting the knowledge of the philosophy of the New Church.

Respectfully submitted,

ALFRED ACTON,

Bryn Athyn, May 27, 1921.

Editor.

PRESIDENT'S ADDRESS.

BY PROF. LEWIS F. HITE.

SWEDENBORG'S PHYSICS.

The physical world was for Swedenborg ordinarily a real world, just as it is for all of us when we take it as it comes and ask no questions; but he, like the rest of us, made on occasion the distinction between reality and appearance. For ordinary purposes we take the granite rocks, the marble blocks, the beam of wood, the bodies of plants and animals, the green grass, the blue sky, the blazing sun, to be really, to us ordinary mortals, just what they seem to be. The clean, smooth, white block of marble we take to be solid, hard, continuous, a dense mass of matter, simply a motionless body of marble. But when the physicist takes a thin slice of it and places it under the microscope, he finds that it is not perfectly dense, not a continuous mass, but that it is full of cavities and empty passages, and that small bodies like particles of water, air, or ether go through it without much obstruction. So he does with all those bodies we call hard. The biologist does the same with the bodies of animals and plants; he reduces them to very small soft fluent cells that move easily among each other and behave very much like separate little animals quite far apart. In this way the whole physical world, the world of bodies, is transformed into a world of exceedingly small particles, so small that even to the most powerful microscope they are invisible. For the physicist, then, the real world is invisible and intangible; we neither see it nor touch it.

So Swedenborg took such bodies as metals, rocks, water, air, the bodies of animals and plants, the solid earth and all its constituents and atmospheres to be composite masses; he analyzed and resolved them into groups and systems of rapidly swirling particles, and these particles into smaller and finer particles. The earth and all the planets he traced back to exceedingly hot fluent masses thrown off from the body of the sun. "All the stars of the universe and the inter-stellar dis-

tances are one immense system of moving particles. This picture of the universe is not unlike that which early Greek philosophy framed with its system of atoms in motion; it is still more like the picture which the most advanced stages of modern physics is now framing.

This universe of swiftly moving particles was for Swedenborg, and is for the physicists of our own day, the real physical world. How it is that the world of our ordinary experience appears to us as it does, and is adapted to our use, is a question which the science of physics does not attempt to answer; this is the perennial and final question for psycho-physics. It is true that physics deals with light and sound, and with the various forces, such as gravity and electricity; but these things are utterly different from the light we see, the sound we hear, and the force we exert or overcome. Light, for the physicist, is the invisible system of a certain definite range of ether vibrations, just as sound is for him a certain definite range of air vibrations; while force, in physics, is merely an element in the formula which expresses and measures change of configuration, whether of bodies or of systems of bodies. In short, the world of physics is a separate and distinct realm from the world of common sense; it is an invisible and intangible realm; and yet it is the real physical world, the world of which alone the science of physics treats.

Turning to Swedenborg's pages, therefore, for a knowledge of his physics, we must expect to be introduced into a realm which is utterly foreign to the every-day world of common sense, the world of the five senses. In the world of Swedenborg's physics, just as in modern physics, there are no such things as colors, sounds, smells, tastes—no such things as tangible qualities. It is a conceptual world, where the concepts have answering to them systems of exceedingly small, invisible particles; but these particles, by composition and recombination, make the bodies we see, touch, and handle, the air we breathe, the water we drink, the food we eat, the coal and wood and gas we burn, the stones and bricks and timber our houses are built of, the mountains we climb and the seas we sail. In spite of the utter separateness and unlikeness of the two worlds, the

world of physics and the world of the senses, we pass at pleasure and with ease from one to the other, because of the fact that we may live, and many of us do live, in both worlds at the same time; and we are enabled to do this by having not merely the senses, but imagination, conception, the powers of abstract thought and the faculty of reasoning. Nevertheless there is a gap between the two worlds, like the gap between brain state and mind state, and it is this gap that the philosophy of physics makes it its task and problem to fill. But the special problem of the physicist is to dissociate the physical from the psychological world, and to interpret the nature and behavior of bodies strictly in terms of physical and chemical analysis. Accordingly, as a glance at any recent text-book on physics and chemistry will show, these sciences begin with the bodies of common observation, but soon pass to bodies which are never directly observed by any one or by any method. The chemist, for example, passes from water to the molecules and atoms of oxygen and hydrogen; the physicist from the burning charcoal to the vibrations of ether particles, or from an electric spark to the wondrous systems of circling particles comparable to our solar system. In the great chemical and physical laboratories there are machines and instruments of various degrees of precision and delicacy which exhibit and record changes and movements far too minute for ordinary observation. In these laboratories they separate water into two gases, oxygen and hydrogen, which have constant and characteristic modes of behavior; but the molecules and atoms themselves are beyond the reach of the finest instruments and the most highly magnified powers of vision; they are objects of imagination and thought, and the products of reasoning and computation. With the aid of the imagination and through such reasoning and computation, the physicist enters his own proper realm of heat, light, sound, electricity; the realm of particles and systems of particles whose nature and behavior are thought to explain the actual events that are brought about in the laboratory.

Swedenborg, likewise, began with observations of the behavior of iron and copper in mines and furnaces; he extended his observations to the rocks, mountains, and hills where the

mines were placed; he observed the arrangement of the rocks in layers, and the evidences of the action of the sea; and he marked the imprint of animal skeletons in the rocks high up on the mountain sides. With eager scientific curiosity and with an extraordinary bent for scientific generalization, he began to form comprehensive theories in explanation of the facts before him. Meanwhile he busied himself noting down his observations and experiments, and in the course of time produced a series of volumes which he entitled *PRODROMUS PRINCIPIORUM RERUM NATURALIUM* and *OPERA PHILOSOPHICA ET MINERALIA*. In these volumes he brought together the results of twenty years' unremitting labor. After his return in 1714 from four years' travel, he busied himself with mechanical invention, and with further scientific observations and experiments. In 1716 he became editor of the *DAEDALUS HYPERBOREUS* and was appointed by King Charles XII member of the Royal College of Mines. These two events gave scope and direction to his scientific pursuits. From 1716 to 1720 he was busy writing detached scientific essays on various subjects, such as soils and muds, fossils, fire and colors. During the same period he wrote a *New Arithmetic*, also an *Algebra* and a *Geometry*. Toward the end of this period he began to enlarge and systematize his labors and to prepare materials for his larger works. We note that about this time he wrote papers on the *Causes of Things* (1717), the *Essence of Nature* (1718), and the *Earth's Revolution* (1719). Then we come to the period of the *Principia* studies. From 1720 to 1729 he was deeply absorbed in mining operations, at the same time that he was developing his scientific and philosophical ideas.

Let us glance at the literary productions of this period and bring to mind the immense variety and the enormous amount of materials he gathered together. In 1721 he wrote and published the *PRODROMUS PRINCIPIORUM RERUM NATURALIUM* (pp. 250). At some time during this period he wrote, but never published, the *PRINCIPIA RERUM NATURALIUM*, afterwards (1913) translated and published as the *MINOR PRINCIPIA*. He followed this with a larger book of the same title, now for the first time published in the Royal Swedish Academy

edition (1908). In the years 1724 and 1725 he wrote, or rather perhaps finished, a remarkable series of books on the metals and other substances involved in mining and smelting: on Copper and Silver (pp. 363) on Vitriol (Sulphuric Acid) (pp. 405); on Sulphur and Pyrites (pp. 335); on Salt (pp. 343). We have here altogether for this period the labor represented by 2,300 pages of MSS., besides various short essays, such as the papers on Swedish money and finances, and festal odes.

This brings us to the culmination of his work in the physical sciences, the publication of the three monumental and immortal volumes entitled *OPERA PHILOSOPHICA ET MINERALIA*; volume I, the crowning work of his studies in Physics, known as the *Principia*, 452 large folio pages; volume II of 386 pages on Iron; volume III of 534 pages on Copper. It is aside from our immediate task to characterize the volumes on Iron and Copper, but it may be said in passing that they are the most complete books of the kind in existence. The same may be said of the *PRINCIPIA*; we may parallel what a recent critic has said of the *RATIONAL PSYCHOLOGY* by remarking that the *PRINCIPIA* is the best specimen of analytical and constructive thinking of the kind in existence.

It will help us to appreciate the task which Swedenborg accomplished in the *PRINCIPIA* if we follow the course of his own approach to it. We have already mentioned his chief tentative essays and his preliminary studies in physics, but we must now go over these preliminaries in some detail, so as to be sure of getting before us just how the physical world presented itself at that time to his view.

As mining engineer and as a most industrious superintendent of mining operations, Swedenborg was much engaged in studying both the details and the principles of these operations; his interests and observations naturally extended to the nature of the country where the mines were located and he made careful and important geological notes which entitle him to rank among the earliest geologists of Sweden. He became deeply interested in the evidences of the action of water high up on the hills and mountains; he noted the stratification of the rocks,

the presence and arrangement of fossils, and the placement of immense boulders on the lowlands. The significance of these observations seems to have been his first effective scientific stimulus, and as a devout Bible reader he at once connected these evidences of water action with the story of the Flood. But his scientific interests and his rare powers of generalization soon asserted themselves, and he began to ask questions about the nature of water and the origin of the world.

Early Greek Philosophy began with the assertion that all things come from water. Curiously enough, Swedenborg's first cosmological speculations begin with the same view. He argues at length and in detail, on the basis of much scientific experimentation, that the whole earth was at one time under the sea, and that all the irregularities and features of its surface, the hills and the mountains, were caused by the movements of this great heavy sea. But he went even further, and theorized about the formation of salt and other bodies out of water itself under very great pressure. It was the evidences of the action of water everywhere on the surface of the earth that suggested to him the idea of a primeval ocean completely submerging and inclosing the earth. We have no record of the arguments by which Thales supported the thesis that all things come from water, but if we stop to consider the universality and importance of water, such arguments easily present themselves. At any rate, this idea of a primeval ocean seems to have been the special scientific stimulus that urged Swedenborg to cosmological speculations. He connected the evidences of this ocean with Noah's Flood, and in his approach to the hypothesis he suggested at this time that the original form of matter was water, he cites what is said about water in the Story of Creation. He introduces this hypothesis somewhat abruptly in the MISCELLANEOUS OBSERVATIONS in the following characteristic words: "Many hypotheses may be stated respecting the primeval matter of the earth and planets; but though nothing but conjecture can be claimed in treating of the remote antiquity of creation, yet we shall here give reasons which seem to show that the original matter of the earth may have been water." Then after stating the reasons, seven in all, he

concludes: "But these views are only put forth by way of conjecture." This seems to be the first and only mention of the hypothesis. But, of course, when we come to the *PRINCIPIA*, water appears in the series of elements as the purely material finite; so the positions are not so far apart as might at first appear.

But the importance of water in an account of Swedenborg's physics is the fact that it was his study of water that led him to his theory of particles. His whole theory is anticipated in his summary of conclusions about the structure of the water particle. He says: the particle of water is round. On its surface there are crustals of the fifth kind. On the surface of these again there are crustals of the fourth kind, and so on to the first kind, and at length to mathematical points, or to atoms composed of points.

This is a very concise, but at the same time a quite definite, forecast of the whole doctrine of the *PRINCIPIA*. But before taking up the *PRINCIPIA* we need to examine in more detail the earlier and preliminary investigations and theories. The modern and careless reader is apt to pass over these early investigations and theories as crude and absurd, but a genuine and competent scientific and philosophical interest would lead to an earnest and painstaking study of these preliminaries, as well of the finished product in the *PRINCIPIA*. There is on the part of professed New Churchmen, as well as among outside scientists, altogether too much of the attitude of superiority and condescension towards Swedenborg's science, especially his science of physics. Such an attitude smacks more of the love of the world than of scientific and philosophical truth. A modest confession of ignorance and incompetence, such as William James was in the habit of professing, would be more becoming.

Turning to the physical theories of this earlier period, we are attracted by the effort to work out the principles of chemistry on the basis of a comprehensive and thoroughgoing mechanics of particles; and what is important for us to constantly bear in mind is that these theories hold over and are more systematically developed in the *PRINCIPIA*.

We suggested above that Swedenborg's geological and physical observations, carried on in conjunction with his superintendence of mining operations, were the occasion, if not the original stimulus, of his cosmological speculations. The evidences of water action high up on the mountain sides suggested that the earth at one time was deeply submerged in an all-encompassing ocean. He naturally connected this with Noah's Flood, but immediately enlarged the conception. The irresistible tides and currents of this immense ocean accounted in his view for the configuration of the earth's surface; and, furthermore, the immense pressure of this body of water accounted for the production of the rocks and minerals of the earth's crust. In this way he was led to that astonishing theory, astonishing in a man of his attainments, historical and scientific, that water is the primary substance of the earth. There is no doubt that he took this theory seriously, for it lies at the basis of all his work in showing how the salts, the acids, the oils, etc., are produced by the action of water particles under the enormous pressure to which they are subjected "in the profoundest depths of the sea." At this point it is pertinent to refer to the experiments of Professor Bridgman of Harvard, cited by Professor Howard in *THE NEW PHILOSOPHY* of July of 1920. The experiments showed that water under exceedingly great pressures is compressible; under the pressure of 12,000 atmospheres it loses one fifth of its volume, and, what is especially significant for Swedenborg's theory, the loss of volume is in the nature of a sudden collapse, indicating a rearrangement of the particles.

However remote from actual conditions this theory of the production of salt and its derivatives, the acids and the oils, may seem to the educated modern physicist, its scientific value is obvious and unquestionable. The observations which led to the theory are surprisingly abundant, and the interpretation of the facts observed is for clear and consistent. It is from this point of view that we should approach Swedenborg's science, not from the narrow sectarian point of view of scientific specialists. Unfortunately, we are at a serious disadvantage in attempting to study in a large way Swedenborg's approach to

his theory of water particles. His constant reference in his *CHEMISTRY* to parts I–VII of the “Principles,” and the fact that the *CHEMISTRY* as published and translated begins with part VIII, points to a most important body of previous investigation and discussion, which we very much need for the task of ascertaining the experimental and theoretical foundations of Swedenborg’s physics of particles.

This is not the occasion to examine in detail the body of discussion presented in the *CHEMISTRY*; the work of Professor REGINALD W. BROWN published in *THE NEW PHILOSOPHY* of April and July, 1918, shows how much is to be done in this direction. There is, however, one aspect which presents a serious difficulty and needs to be closely examined. One of the constant agents in the world of Swedenborg’s physics is Fire. Together with water, fire plays a fundamental part; and, to a great extent, it determines the nature and behavior of water. In fact, the water particles seem to exist and move in an ocean of fire. Fire is often spoken of in this connection as “the subtle interfluent matter”; it presses upon the water particles on all sides, and is at the same time the medium which secures to them their free movement. Swedenborg’s doctrine of fire is one of the most complicated and difficult of his physical conceptions. In fact, fire and water hold a central position in the physics of this early period, and it is historically worthy of note that Swedenborg here combines the doctrines of two great lights of Early Greek Philosophy—THALES, who held that all things come from water, and HERACLITUS, who maintained with vast philosophical significance that all things are transformations of fire. If we bear in mind that water corresponds to natural truth and fire to love, we get a glimpse of the importance of the cosmical position of fire and water.

At any rate, we must insist that the serious student of Swedenborg’s physics must give close and systematic attention to the achievements of this period, and he must be broad-minded and free enough, must be highly educated enough, to appreciate the exhaustless scientific curiosity, the intellectual penetration and audacity that were brought into play to construct even the early stages of his physical theories.

A transition from the mechanics of the water particle to the elaborate system of the *PRINCIPIA* seems to be made through the Bullular hypothesis. This hypothesis is another instance of bold speculation fully conscious of itself as such. Here a new element, the air, in addition to fire and water, is brought into prominence. The nature, structure, and behavior of the soap bubble may serve as a type of the particle structure and as an element of the particle theory. Here again we need to get at the foundations of the theory, the facts and interpretations upon which it rests, to be secure in a fair scientific estimate of it. But the limits of this paper do not permit even a summary account of the Bullular hypothesis.

One and perhaps a primary source of difficulty to the modern reader in attempting a fair estimate of the early speculations is the scientific prejudice under which he inevitably labors; but back of this is the apparent incongruity between observed facts and the conclusions which Swedenborg adopted. The chemistry and physics of today have developed a nomenclature and a technique which seem out of all proportion to the meager range of Swedenborg's treatment. But we must be careful to note that when Swedenborg speaks of the production of salts, acids, oils, etc., he is not speaking of these things as the bodies of ordinary observation, nor even in terms of the physical and chemical laboratories, but he is speaking of them in terms of the theoretical chemist and physicist—that is, in terms of particles, and their structure and behavior. At this point Swedenborg and modern science are on common ground, and on this ground they may be compared. In other words, for the theoretical physicist of today, as well as for Swedenborg, these bodies are systems of particles; and the question is, Whose system is the more consistent?

It remains to make brief reference to the system of the *PRINCIPIA*. The elaborate forecast known as "The Lesser Principia" seems to be a tentative and preliminary essay, but nevertheless it should be most thoroughly studied and mastered before undertaking to read or criticize the great work of the *PRINCIPIA* proper. Scientific and philosophical interest may well be directed to the starting points of the two books. In

the one, the earlier, Swedenborg shows how by motion of the point other dimensions are produced. This is accomplished by giving the point exceedingly rapid motion, so that it is practically everywhere present within a given area, as the rapid circular motion of a light gives the appearance of a continuous loop.

The PRINCIPIA is even more audacious, in that it undertakes to develop the nature and motion of the point from the Infinite. This point by composition and recombination produces the whole series of finites, actives, and elements. In the construction of this series Swedenborg's physics culminates. Here the particle theory is fully developed as a cosmological system in which the starry universe, our solar group, the earth and its atmospheres, all have place. But we must ever bear in mind that for Swedenborg's physics this universe is a kingdom of invisibles, an immense system of particles in their various combinations and aggregations. This is also the world of the present most advanced stage of physical theory.

It is almost an offense to treat Swedenborg's physics in this summary fashion, but if it stimulates others to attempt a more adequate treatment, the work of this Association will be so far promoted.

THE DOCTRINE OF SERIES AND DEGREES.

BY JOHN WHITEHEAD.

In the investigation of nature Swedenborg was led to consider the nature of order, for without a clear idea on this subject he could not discover the relation and connection of things. He formulated his ideas of order in a series of doctrines. He found that in all planes of nature these doctrines applied. He continually makes use of them in the investigation of nature.

After his spiritual sight was opened, and the function of investigating the spiritual world was given him, he found that the same principles of order were embodied in the spiritual world as in the natural world. In the progressive formation of all things by God everything proceeded in an orderly series of progression. In the work of creation God introduced order into the universe and into every part of it.

In the development of his philosophy of nature Swedenborg made great use of this doctrine of order, for by means of it he discovered many of the secrets of nature. In the work on the Animal Kingdom he says:

"I purpose to give an introduction to rational psychology, consisting in certain new doctrines, through the assistance of which we may be conducted from the material organism of the body to a knowledge of the soul, which is immaterial. These are the Doctrine of Forms; the Doctrine of Order and Degrees; also the Doctrine of Series and Society; the Doctrine of Influx; the Doctrine of Correspondences, and Representation; lastly the Doctrine of Modification." (*A. K.* 14.)

Swedenborg here speaks of these as new doctrines. By this we do not understand that many of the facts involved were not known before, but that as systematic doctrines they had not been previously formulated. He systematized these doctrines and applied them as means of unfolding the secrets of nature. He afterward applied them even more fully and perfectly in the treatment of spiritual subjects. In this paper we will con-

fine our attention to the Doctrine of Series and the Doctrine of Degrees in their application to the study of spiritual and natural things.

The Doctrine of Degrees shows that the universe exists in distinct degrees or planes one above or more interior than another. The Doctrine of Series shows that all things in the created universe spiritual and natural are connected together in series of cause and effect. Discrete degrees, although distinct from each other, are not disconnected from each other. The lower plane or degree has an intimate connection with the higher, a relation of effect to its cause. This relation may be seen from the connection of the mind with the body. The lower is exactly adapted to the higher, serving as its clothing, by which the activity of the higher is brought down into a lower plane and takes a less active form. The lower corresponds with the higher.

Of these doctrines of Series and Degrees we read in Swedenborg's *RATIONAL PSYCHOLOGY*:

"By way of an introduction to Rational Psychology, I will premise the Doctrine of Series and Degrees. A doctrine of which in the previous chapters I have made such frequent mention, the design of which is, to teach the nature of order and its rules as observed and prescribed in the succession of things. For the rational mind, in its analytical inquiry into causes from effects, nowhere discovers them, except in the subordination of things, and the co-ordination of subordinates. Wherefore if we would advance from the sphere of effects to that of causes, we must proceed by orders and degrees, agreeably to what rational analysis itself both approves and advises (n. 67, 161). The rational mind also, by means of this doctrine carefully investigated and established, will see opened to its view a broad and even path leading to principles of causes, and will behold the dissipation of those occult qualities, which, like the shadows of a thicket, deepen at every step so as to shut out all further prospect and progress. For as often as nature betakes itself upwards from visible phenomena, or, in other words, withdraws herself inwards, she instantly as it

were disappears, while no one knows what has become of her, or whither she has gone, so that it is necessary to take science as a guide to attend us in pursuing her steps. But whereas all things in succeeding each other follow one another in order, and whereas in the whole circle of things from first to last there is not a single one which is altogether unconnected or detached from the rest; I am therefore compelled, as I said, previous to developing the subject of Rational Psychology, to take into consideration this doctrine of order and connection, so remarkably conspicuous in the animal kingdom." (2 *E. A. K.*, 579.)

It will be observed that Swedenborg here identifies the idea of series with that of order itself. He shows that all things are connected together in a certain order of succession one from another. Thence they hold a certain relationship to each other. All things, therefore, follow in order, nothing being independent of other things. Thence exists the relationship of cause and effect. Man's rational faculty is especially exercised in the perception and investigation of causes and effects; or what is the same, the perception and investigation of the position and relationship of things in their series of succession, subordination, and co-ordination.

The science of series and degrees will therefore give us important and indispensable tools for the use of rational analysis, opening the way for the perception of causes, removing those things which produce obscurities, and which lead the mind astray, such as the fallacies of the senses and false hypotheses.

The belief that all things embody the principles of cause and effect is inherent in the rational mind. All scientists and philosophers are engaged in the investigation of this relationship. The science of theology is largely devoted to the consideration of God, the first cause of all, showing the relationship of all things to Him. The doctrine of evolution is but the construction of a series, in the order of which, it is supposed, all things were produced one from another in succession. Le Conte recognized this when he said that "the Doctrine of Evolution constitutes more than half of all science."

In studying the doctrine of series and degrees, and in learning the rules of their order, we are learning the principles which lie at the foundation of all science, philosophy, and theology. It enters into all the spheres and relationships of life. The human mind is built up and developed in an orderly series, so that this doctrine will enlighten us in the principles of education. It will open to us the orderly way in which we should instruct the adult and prepare him for heaven. It lies at the very foundation of the minister's use and function of leading to the good of life by doctrine from the Word.

Degrees are treated of in the philosophical and theological works of Swedenborg. But the subject of discrete degrees is most clearly elucidated in the theological works. Discrete Degrees are in a series from God by steps downward to the lowest things of nature like the steps of Jacob's ladder. But when any degree of that series has been produced, or anything in a degree, it then exists in what is termed a continuous degree. That is to say, when a thing has been produced, it is the result of all the prior series, but on its own plane there exists that which is more or less of that thing. This may be illustrated by the three conditions of matter: when the solid has been produced from the liquid and that from the gaseous form, the solid is the result of a descending order or series of gas and liquid; but when once formed there is started a series of causes and effects on that plane by its action on adjacent things. In the case of animals and plants, there begin series of propagations of the same or similar organisms in a long succession.

Thus we may see that there are two orders or relationships of parts: one that of a substance or thing to some corresponding substance or thing on a higher or a lower plane, to which it bears the relationship of cause or effect. In this case the things exist in certain series of cause and effect in discrete degrees. On the same plane, or in simultaneous order, things also have a relationship to each other in a series, and they enter into certain series of causes and effects there, but these are not essential causes, but secondary.

Series and degrees express two great principles of order which are embodied in all things of the universe. They have

a close relationship to each other, but there is a great difference between them. The doctrine of degrees shows the distinction which exists between substances and planes of realities. The doctrine of series shows or expresses the order and relationship and the connection which exists between them. It shows the interrelation and interdependence between things. Series shows the links in the chain of causation revealing the unity which exists. Degrees shows the separate links as links and the nature of those links separately considered.

In viewing the doctrine of series in relation to that of degrees, it may be well to mention some of the principles which it involves. From what has been already said, it may be seen that the doctrine of series is one of the essential factors of scientific classification. It involves the arrangement of things in their true order, and shows the chain of connection both in their original production and in their continued existence. The doctrine of evolution is but an attempt to determine the order and series in the production of vegetable and animal forms; but since the doctrine of discrete degrees is unknown to the advocates of evolution, the most important factor in creation is lacking in the theory; for the order of creation is from above down through discrete degrees.

The value of this doctrine of Series may be seen from what Swedenborg says of it in the Introduction to his *RATIONAL PSYCHOLOGY*.

“The science of natural things depends on a distinct notion of series and degrees, and of their subordination and co-ordination. The better a person knows how to arrange into order things which are to be determined into action, so that there may exist a series of effects flowing from their general causes, the more perfect is his genius. And inasmuch as an arrangement of this kind is prevalent throughout nature, so the faculty of arranging is perfected by observation and reflection on the objects of nature, by natural abilities, and by the assistance of those instructors whose minds are not too artificially moulded, or under the influence of prepossessions, but who claim to themselves a freedom in contemplating the objects of nature

with a view to becoming instructed by things themselves as they flow in their order." (*A. K.* 587.)

APPLICATIONS OF THE DOCTRINE OF SERIES.

Swedenborg in the *PRINCIPIA* says:

"No world can exist, abounding in any variety of objects and phenomena, without passing through a succession of states and of intervals of time; through a succession of changes and contingencies; through modes or modifications; through series of things successive, simultaneous, and co-existing; likewise through connections of series; as also iterated separations and connections; whence arises the perfection of its compositions."

(*Vol. II*, p. 242.)

Again he says:

"The world subsists by the same series by which it exists; and in respect to its subsistence and existence, has perpetual relation to its first principle. The more perfect the world exists and subsists, the more easily may it refer itself to its first principle. Consequently the more perfect and beautiful is it in its direct series, than in its indirect; in things composite and connected than in things simple and separate; in series possessing a larger and freer motion, than in series possessing one more restricted." (*Ibid.*, p. 244.)

The same principle applies in the human body. It is an epitome of the world. It is a microcosm. If the doctrine of series and degrees unfolds the order of the larger universe, so also does it reveal the wonderful order in the human body. In his physiological studies, Swedenborg made constant use of these doctrines. He thereby discovered many things relating to the uses of the various organs of brain and body.

A similar application of these principles is found throughout the theological works. This gives to his theological works their rational form and order. In fact, this is distinctly referred to in *TRUE CHRISTIAN RELIGION*, where he compares the propositions and arrangement of subjects in that work to the arrangement of the fibers in the human body. Sweden-

borg's rational mind, developed through his remarkable insight into the principles of nature, now manifested the same faculty of arranging the subjects which came under its view in orderly series when he wrote his theological works.

It may now be seen that the doctrine of series and degrees manifests the connection and arrangement of all things in two orders: *first*, in successive order, which is the order of creation in the order of descent from God to the world; *second*, in simultaneous order—that is, in the order of its existence after it has been produced. These doctrines show the discrete planes of existence from God to man and the world. They show how these things have proceeded, one from another, from inmost to outmost; also how on each plane one thing is connected with another and co-ordinated with it. The principles of this order apply to both worlds, to the forces operating therein, and to all forms both living and non-living. They apply to the human body, to the Word of the Lord, to the human mind, and in their highest application to the Lord Himself in His assumption of the Human and its glorification. The entire universe, spiritual and natural with all things therein is in universal, general, and particular series; the particulars depending on the general series, and these on the universal.

SUMMARY OF PRINCIPLES.

In a short paper we can give only an outline of this important doctrine. The two doctrines of series and degrees need to be viewed together to see them aright. Not only is it needful to know the doctrine of discrete degrees, but the doctrine of series is equally necessary to clear thinking. It is also essential that the series be seen in its true order as things are produced or created from the true center. When the earth was believed to be the center it was impossible to formulate a true classification of the facts. No true science of the solar system was possible. The series of progressions and interrelations of sun and planets were not seen. But when it was discovered that the sun was the center all things fell into a natural order, and the beauty and harmony of this order convinced of its truth.

A similar principle applies to spiritual things. Materialism

makes the earth the center. It views all things upside down. The last produced is regarded as the all in all. The Divine and the Spiritual are unseen and unknown. Their series and degrees are unrecognized.

Idealism which denies the reality and existence of the world of matter is equally blind to essential factors in the series, degrees and order of creation. It fails to recognize the reality of the foundations on which all the interior things rest.

Swedenborg, in his doctrine of Series and Degrees, places all things in their true order and relationship. He reveals the true center of the entire system of universal existences. He reveals the relative position in which all created things stand toward God as the center.

We wish to call attention in this paper especially to the importance of the doctrine of Series. The subject of Degrees has often been treated of; but little is said of the subject of Series. Yet Swedenborg lays great emphasis on this doctrine also. The whole universe is in series. The operations of the human body and its organs are in series. The Word itself is written in series—a fact which is used to prove its Divine nature. Everything is linked together in a series of ends, causes, and effects. To perceive this logical connection of things, to see the series and degrees, is a means of developing the rational mind and a preparation for opening the spiritual. The Writings themselves revealed by the Lord, using the rational mind of Swedenborg in formulating them, are a rational series of spiritual truth, adapted to the opening of the rational and spiritual degrees of the mind. These also are written in Series, as we may see from the following, with which we close the paper:

351. (2) *That there is a Disposition of the Truths of Faith into Series, thus, as it were, into Bundles.* That it is so, is unknown as yet, and it is unknown, because the spiritual truths, of which the whole Word is composed, on account of the mystical and enigmatical faith, which makes every point of modern theology, could not appear; and, therefore, like store-houses, they have sunk down into the earth. That it may be

known what is meant by series and bundles, it shall be explained. The first chapter of this book, which treats concerning God the Creator, is distinguished into series, the first of which is concerning the Unity of God; the second, concerning the *Esse* of God or Jehovah; the third, concerning the Infinity of God; the fourth, concerning the Essence of God, which is Divine Love and Divine Wisdom; the fifth, concerning the Omnipotence of God; and the sixth, concerning Creation; and the articulations of each make the series; they bind together those things which are therein. (T. 351.)

352. (3) *That Faith is perfected according to the Abundance and Coherence of Truths*, follows from the things said above, and manifests itself to every one who collects reasons, and sees what multiplied series effect, when they cohere as one, for then one thing strengthens and confirms another, and they together make a form, and, when in action, they present one act. Now, because faith in its essence is truth, it follows that it becomes, according to the abundance and coherence of truths, more and more perfectly spiritual, thus less and less sensual-natural; for it is exalted into a higher region of the mind, whence it sees under it numerous confirmations of itself in the nature of the world. True faith, by a copious store of truths cohering as it were in a bundle, also becomes more luminous, more perceptible, more evident, and more clear; it also becomes more capable of being conjoined with the goods of charity, and thence of being alienated from evils; and successively more removed from the allurements of the eye, and from the concupiscences of the flesh; consequently, more happy in itself; it becomes, especially, more powerful against evils and falses, and thence more and more living and saving. (T. 352.)

THE ORIGIN OF MAN.

BY ALFRED ACTON.

The subject of the creation of man, like the study of the human soul, requires of one who would penetrate its mysteries a truly rational mind, a knowledge of all the sciences, and a philosophy of universals that can be derived only from such knowledge. Swedenborg undoubtedly realized this, for he did not propound, or even outline, his doctrine concerning the origin of man until that intermediate period which witnessed the close of his scientific and philosophic studies and the commencement of his work as revelator. The doctrine is set forth in the *WORSHIP AND LOVE OF GOD*, and where it is presented as the direct fruition and culmination of all those studies which had been embodied in the preceding chemical, cosmological, anatomical, physiological and psychological works. It is with the object of setting this doctrine forth in this light, and especially of contrasting it with the prevailing theories as to the origin of man, that this paper is written.

There are many theories as to man's creation, but they are all embraced in the four following heads, which also set forth the order in which we shall discuss the subject. These heads are:

1. The *FIAT THEORY*; that man was created by God's direct command, according to the ordinary understanding of the story in *Genesis*.
2. The *EVOLUTIONARY THEORY*; that man has been gradually evolved from preceding forms of animal life by a series of natural variations, developments and selections.
3. The *HOMININE ANIMAL THEORY*; that man originated from seed directly created by God in the ovum of a brute animal.
4. Swedenborg's doctrine, which may be called the *MOTHER NATURE THEORY*; that man came into being by the creation of human seed in ova provided by the vegetable kingdom.

THE FIAT THEORY.

The first of these theories has its name from the Latin word *fiat*, "let there be." It is the original theory of the Christian Church, and is still maintained by the orthodox. It is based on the story of creation as given in Genesis, where it is said that God made man out of the dust of the ground, and breathed into his nostrils the breath of life (2 *Gen.* 7). In the vulgar acceptation of these words the picture presented is that of dust, or rather mud—for it is said that God made a mist to rise up from the earth—fashioned into the shape of an adult man, and suddenly changed into flesh and blood by the inbreathing of life from God. This is the picture formed in the minds of most Christian children, from hearing the words of the Book of Creation. In later years men are apt to smile at this picture as the fancy of the child and unworthy the consideration of the man; and they usually adopt in its place either an attitude of unconcern in regard to the whole question or some purely materialistic explanation of man's creation. But in this men deceive themselves. The statement in Genesis is the statement of revelation; it is a simple one, like the childish grasp of it; but it is nevertheless the expression in the language of ultimate appearances of the truth itself. And in any true education the picture thus presented should be the first to be implanted in the childish mind as the basis for the understanding of the truth involved within it.

The Fiat theory, properly understood, is indeed (or perhaps we should say, might be) the basis of all the theories which we have enumerated above. In its broad aspect this theory is the simplest possible statement of the philosophic doctrine of the Writings, that God created, from His own substance, an atmosphere whereby He might proceed and operate; that from this were formed other atmospheres less and less active, until at last they ended in matter at rest; and that from this matter (the dust of the ground), suitably prepared, God formed all organic forms of life, ending by the creation of man. This is the doctrine as given in the Writings; and its truth is confirmed by the fact that man is being continually created, from day to day, in precisely this way.

The law of man's creation is not a law which ceased to operate when the first man was created. It is a Divine Law, and its operation is unceasing. It is the law by which man is now created, and by which he is continually sustained. The law of creation is the law of existence; for existence is perpetual creation. In other words, the mode by which a thing comes into existence or is created is the mode by which it is continually sustained. We can, therefore, test the truth of any theory concerning creation by examining whether it expresses the law that is operating now, from day to day, in the creation of man—in the birth of an infant, in the sustenance of our body, or the rebirth, as it were, of its every part, and in the birth and growth of the mind.

By this test we see the truth of the law of creation as given in the book of Genesis. It is from matter, the dust of the ground, and from this alone, that the body of man is formed and continually sustained. It is no objection to say that this matter must first be converted into human food by means of the vegetable and animal kingdoms; it is still essentially matter. The bread that we eat is still the corn of the field—corn taken up by human intelligence, and harvested and threshed, and ground and baked, and so prepared that it may be received into the human body and be taken hold of by the soul for the creation and sustenance of the body; but still corn; corn which God has created from the dust of the ground, and which no man can make.

The words "Dust thou art and to dust shalt thou return" constitute, indeed, a true and comprehensive statement of the law of creation both of man and of all organic forms of life. For in the work of creation God-Man continually takes the dust of the ground, divinely prepares it for human food, and from it, thus prepared, builds up and creates the body of man. It is this "dust" thus prepared that enters into the mother's blood to constitute the store upon which the soul of the infant—the breath of life from God—will draw for the fashioning of a body whereby it can enter into the world. And after birth the soul continually takes up new matters from the earth for the sustenance and new creation, as it were, of its body—first by the mother's milk, and then by grosser foods.

And here let me note that something of this thought should be insinuated into the minds of children in connection with the story of Genesis. Not that children should be told that God did not create man from the dust of the ground in the way they picture. Indeed, care should be taken not to do this, for thus doubt may be subtly insinuated as to the truth of the Divine Word. But the genuine truth is sufficiently insinuated when they are shown that it is the dust of the ground by which we live, but dust prepared by Divine Love into fruits and vegetables fit for human food; and that when this food has entered into our mouth God takes hold of it and builds it into human flesh and blood. With this truth insinuated, children, in later years, will see for themselves the meaning of the words, "God created man from the dust of the ground and breathed into his nostrils the breath of life."

The Fiat theory, then, expresses the fundamental truth as to the creation of man. In itself it is not discordant with any of the other theories which we have enumerated. For, to paraphrase a statement made by Swedenborg in his *HISTORY OF CREATION*, whether the dust of the ground is prepared by the animal kingdom, as in the second and third of our theories, or by the vegetable kingdom, as in the fourth, it is still dust of the ground. The theories are but the understanding of the mode whereby man was created from this dust.

There is, however, a very real difference between the fiat theory and the theory of evolution or descent which is now generally accepted. The fiat theory postulates the Will of God as the active force in the formation of man. But the modern theory of descent ascribes the formation of man to the operations of nature alone—that is, to the operation of merely natural forces devoid of love, wisdom, and end. The existence of God-Man, and the operation of Divine Love and Wisdom as the cause of creation, it ignores; or, if it admits the possibility of the existence of God, it assumes an agnostic attitude; and it sees no necessity for considering Divine Love and Wisdom as having any place in the solution of the problems of creation.

THE EVOLUTIONARY THEORY.

And here let me observe that the evolutionary theory is still a theory. The observation is necessary, because the generality of people, and especially the young who come into contact with the sphere of the world's institutions of learning, receive the impression that it has passed the stage of theory and is an established fact. The majority of teachers seem to assume this; for their attitude to all who would question the theory is one of astonishment, if not of contempt, at the temerity or foolishness that would question an unshakably established doctrine. And from these teachers in our colleges and universities there has spread throughout the world that gives any thought to the matter the assumption that the theory of evolution is now beyond question. And yet it is only a theory—a theory, moreover, which, as we shall show, fairly bristles with difficulties. The leaders of the learned world have seen and recognized these difficulties, and many hypotheses have been advanced to meet them, but with little success; for no sooner has an hypothesis been framed to meet one series of difficulties than it is found to encounter others. The learned world is one in the assumption that all organic forms were produced by evolution; but when we come to the means by which that evolution was effected, we find only debated and debatable hypotheses.

It should also be observed that the theory of evolution is not confined to creation, but is a part of a universal sphere of thought which seeks the solution of all the problems of life in the operation of merely natural laws. Thus, applied to the institution of marriage, it teaches that this institution originates in the accumulated experience of men which has gradually established monogamy for the protection of society. So with education, economic and social life, morals, etc.—all are traced to the plasma of the animal nature of man, influenced by climate, environment, conflict, and accumulated experience in the struggle for survival. Religion and the idea of God are held to be an evolutionary growth from the same origin. The belief in a spiritual world, as now held by orthodox Christians, is the

evolution of primitive ideas which in their turn originated in the experience of dreams. Men saw in their dreams friends who had died, and to account for this they invented a spirit-world; they saw implements and other articles that had been lost or destroyed; and so they filled their spirit-world with the implements of war and of the chase, etc. With the growth of organized society they gradually evolved the idea that over the spirits of the spirit-world ruled chiefs whom they called gods, each nation having its own peculiar god. In rude communities these gods were savage and revengeful, but with the gradual evolution of morality a higher idea of Divinity was developed, until at last came the modern Christian idea. But this is not the final or crowning fruit of evolution. In time men will rise superior to the anthropomorphic idea of God, the idea of God as a man, to the conception of men as God, to the realization of the super-man.

The essence of the theory of evolution is that progress is made merely by the operation of natural laws; by this operation advance has been made from senseless protoplasm to modern civilization, with its science, art, religion; and this advance is still continuing.

But positive as the upholders of this doctrine are, yet they have been unable to answer the fundamental objection that will come at once to the thinking mind, as to the origin and spring of all this progress. Granting that man developed from a brute animal, and that the latter was the ripest fruition of protoplasm, from whence did the protoplasm come, and whence the forces of progress? The learned evolutionist may readily admit that here also there must be a cause; here also the operation of a law; and that the law must be prior to the protoplasm. He may even admit the existence of a Supreme Being. But the admission seems to enter only the external thought; for thought concerning that Supreme Being is held to have little or no place in the solution of biological problems.

The most simple reflection must discover that a stream can not rise above its source; that the human intelligence and love evidenced before us did not come from nothing; that all present and all future development of human powers must have been

resident in the protoplasm, if this is their primitive origin. But then what! Is this protoplasm God? Perhaps few would openly admit so bald a declaration. Does it not, nevertheless, express the fundamental thought involved in the theory of evolution as now held? Nature is God; nature without beneficent purpose; nature acting from irresistible laws devoid of spiritual ends. There is no God-Man; no creation from Divine Love and Wisdom; no conservation from Divine Prescience and Providence, to the end that men may receive heavenly blessing! The only real thing is Nature, operating by inexorable laws to slowly but surely produce by the deadly conflict of existence the "survival of the fittest"—man, super-man, super-super-man—all with evidences of a love and wisdom, a thought and judgment, an end and purpose, denied to their origin. Here we have the reincarnation of the old theological dogma of creation out of nothing; the ancient dogma has cast off its worn-out priestly robes, and putting on the insignia of the savant, now sits enthroned in the halls of our universities.

And this protoplasm which thus magically originates all the marvels of the natural and mental world, what is it? It is found, microscopically and chemically, to be but a simple substance. In this the evolutionist is surprised, not to say disappointed. Predicating of it, as he does, such latent powers of development, he would at least expect to find a wonderful complexity. But no! his search reveals only comparative simplicity. How, then, he asks, shall the phenomena of variation be accounted for?—variation so great that it has produced the kingdoms of nature. To meet the situation many theories have been devised by those who have attempted to penetrate more deeply into the mysteries of life. Protoplasm has been endowed with ultra microscopic parts, with biophors, and stroma stems, etc.; and to these theoretical bodies functions and actions have been assigned which shall account for the phenomena of variation. Some assume these invisible constituents of protoplasm to be in perpetual conflict for existence, with the fittest surviving and thus dominating the future development of the plasma. Others suppose that there is some law that prevents the growth of one part over another beyond a certain limit;

while still others suppose there is a natural development of all the parts. All this, however, is mere speculation; speculation which is learnedly discussed since it moves in the field of physics and chemistry, but which would be treated with silent scorn were it to lift up its gaze to the contemplation of Divine Love and Wisdom as the creative and directive cause of the universe.

The doctrine of evolution, in its original form, as put forth by Darwin—and in justice to the latter it should be said that the doctrine was advanced by him only as a tentative explanation of the vast array of facts which he assembled together—in its original form, this doctrine is that man was created by development from a member of the gorilla family, who, by reason of a peculiar hereditary and environment, was enabled to develop, or rather the hereditary and environment developed in him, a certain quality above his fellows whereby he had opportunity to cultivate higher things, and thus become the progenitor, perhaps in a long series of generation, of the first savage man. Among later students the long series does not seem to be an essential part of the process. The Russian savant, Metchnikoff, held that the bridge from animal to man might be crossed in a single generation. In support of this he instances cases of men of genius being born from obscure and ignoble parents. A gorilla distinguished by strength would be naturally in a position to make his fellows undergo the labor of procuring food for him; and being thus relieved of toilsome labor, would—also naturally—have leisure to develop the incipient germ of a mind superior to that of his fellows. By his strength also he would be able to seize for himself the choice of mates; and thus from this select pair might be born the first man of the stone age.

Again let me emphasize that this doctrine is nothing more than a theory, advanced to explain an army of facts—which it does not explain. Facts prove nothing more than themselves; theories are what are devised by men to explain the facts, and these theories can stand only so far as they do actually explain.

Put in a general way, the facts of observation which led directly to the formulation of the theory of evolution are: that

there is such immense variety in the world; that the varieties in different species are so great that it is impossible in many cases to tell the dividing line; that the like is true of genera, and even of the line between the vegetable kingdom and the animal, and between the organic and the inorganic. Moreover, there was observed a certain relation between varieties and climatic or other environment, and this observation was strengthened by the study of ethnography and the observation of the effects of surroundings and climate in the development of national character. In the field of anatomy there was not only found to be a remarkable unity between different species of animals, which indicated a common origin, but there were also found what were taken to be vestiges of organs which had functioned in some progenitor, but which were held to be now entirely useless, if not harmful. This is most commonly illustrated in the observation—much cited by university students of biology—that before birth the human fetus possesses “fish gills” which are quite useless, and which later on disappear—a proof that the fish has some place in our ancestry. Apparently we, and our progenitors for all known time, have not succeeded in entirely removing this vestige of our fishy existence, though we have pushed it back to our embryonic life where it can do least harm. Another popular illustration of a “useless” vestigial organ is the vermiform appendix, which, it is held, is doomed in time to extinction, though meanwhile it is giving abundant occupation to our surgeons.

It is to explain these and similar observations that the theory of evolution has been advanced. And although it has been shown by learned biologists and others that the theory does not explain the facts, but is, on the other hand, contradicted by them; although the same thing has been shown to be true of every modification of the theory made to meet this or that class of objections; yet the essential position of the theory remains so firmly rooted that it is today the center and universal of the learned thought on all subjects.

This “essential position” is not Darwinism, properly so called, but the theory of descent. Darwinian evolution is merely one of the explanations as to the mode whereby the

descent was effected; an explanation that has been largely discredited by later experiment and criticism. But the theory of descent still remains. Criticism and new discoveries have indeed compelled it to modify one point or another, but essentially there is no change; and the theory is to-day more firmly established in the university than ever were theological dogmas in the halls of oecumenical councils. The power of the theory rests in its universality, and especially in its promise to explain the mysteries of existence without resort to the idea of God. The learned world is eager for such an explanation, which alone can satisfy the senses, and thought from the senses. Hence we have the unceasing labors of the biologist in hatching out new theories as to the mode or cause of descent; theories which are no sooner born than they are the center of attacks based on a new array of facts; which, in turn, give rise to new theories and new attacks. And so the Sisyphean labor continues.

For it is a fact, perhaps not realized by the ordinary student, that while the theory of descent reigns unquestioned and supreme in the learned world, there is in that world nothing approaching agreement respecting the modes or causes of descent.

But let us return for a moment to that assembly of facts to which the theory of descent is supposed to furnish the key; and let us observe that Swedenborg offers us another theory to these phenomena, and one, moreover, that appeals to enlightened and Christian reason.

It is popularly supposed that the facts known in Swedenborg's day were but meager. But the truth is that the exact contrary is the case. In the eighteenth century there was an immense array of facts ready to men's hands, especially in the field of anatomy. Indeed, in this latter field we have gained little in the acquisition of essentials, however much we may have advanced in the knowledge of minute details. Swedenborg had a true vision of the future when he wrote in his *PRINCIPIA*:

The sciences which have now for some thousand years been adding to our experience may at this day be said to have so far advanced that

the enquiry into the secret and invisible operations of nature need no longer be deferred. Indeed it does not appear that there is any occasion for that infinite variety of phenomena which some deem necessary, in order to acquire a knowledge of natural things. We have need only of the more important; of such as bear directly and proximately upon the point, and do not diverge too obliquely and remotely. The remaining mass of experiments may be safely laid aside as not essential; indeed they would tend rather to divert the mind than to lead us onward in our investigation. For a countless variety of phenomena are very remote from their first origin and discover no path leading to it except through manifold and intricate mazes. Nature may be likened to a labyrinth; if you are in this labyrinth, the attempt to wander through all its windings, and to take note of all their directions would be fruitless; for in this case the puzzle would only grow the more inextricable, you would only pursue your footsteps in a circle; and, when most elated by the prospect of emerging, would come to the selfsame spot. And so if you would reach with ease, and possibly by the shortest road, the exit of the labyrinth, you must reject the senseless wish of exploring all its intricacies; rather, planting yourself at some intersection of its paths, strive to ascertain somewhat of its general figure from the circuitous route you have already trodden, and retrace, if advisable, some of your steps. Thus may you easily ascertain the way leading to its outlet, and there obtain the clue to direct you through all its mazes; and when you have familiarized yourself with their plan, you may throw aside even the clue itself, and fearlessly wander about in the labyrinth without it. Then, as if seated on an eminence, and, at a glance, surveying the whole labyrinth which lies before you, how will you smile in tracing the various windings which had baffled your judgment by manifold and illusive intersections!

We have quoted this passage both because of the picture it presents of a learning which is so over-burdened with a labyrinth of details—important enough for special purposes—that it is unable to see the golden thread that alone can guide its way and also to give some indication that in Swedenborg's time there was an abundance of the facts of experience, sufficient to serve as the basis for rational induction.

That nature was filled with variety; that there was an indistinct line between the genera and even the kingdoms of nature; that comparative anatomy revealed a remarkable similarity between animals of every kind and man—all this was well known to Swedenborg, and later investigations have served rather to emphasize the fact and embellish it with details than

to reveal it. Swedenborg also advanced a theory as the key to these phenomena. The infinite variety of nature is the picture which represents the infinite; is the indefiniteness of creation emulating the infinity of God. Nothing is or can be the same, since each represents something in the Infinite. As regards the similarity of organs, he says that Nature is the same in greatest and in least; everything in nature presents an image of God-Man, and this image constitutes the likeness which is observed in all things of creation. As to useless organs, Swedenborg did not and could not recognize anything useless in nature, and still less in the human body, the supreme work of nature. Instead of confirming a godless theory by the appearance of useless organs, he girded his loins and sought for and found the uses of those organs—uses, some of which have been since published as more recent discoveries.

See the contrast here presented. A philosophy that everywhere contemplates use, the image of God-Man; and a philosophy that sees “vestigial” organs, left over by nature, organs which not only serve no use, but are even harmful. Can you imagine a workman who has improved a piece of machinery leaving some useless part of the old model? And shall we be so stupid as to suppose that nature—to say nothing of God—has done this very thing? Moreover, the hypothesis involves that nature previously did not know how to build her new machine; and if this is so, where, then, did she acquire her knowledge? Knowledge can not come from nothing.

And here let me call attention to the cogent objection that has been raised against the theory of descent by natural selection, that it leaves unexplained the supposed final disappearance of useless organs. Lack of exercise may diminish an organ in size, but, as shown by abundant experience, it cannot abolish it. The forces that form it remain, and until these are removed the organ will persist. For its supposed disappearance no satisfactory hypothesis has ever been put forward.

A fundamental objection to the theory of descent is the doctrine that influx is according to reception. Where there is a difference in the receptive vessel, there is also a difference, to the same degree, in the manifestation of the life flowing into

that vessel. This is well illustrated by the influx of the heat and light of the sun. These flow into all subjects of the vegetable kingdom, but they are variously manifested, or produce various organic forms according to the nature of the vessel that receives them.

To a certain extent it is true that environment and other external causes do produce some effect, some difference, on organic forms of life. In one climate a plant may grow to perfection, while, transported to another, it may become poor and imperfect. The same effects may be produced also by human agency, in the way of breeding, grafting and cultivation. But in all such cases the change or modification of the vessels receptive of life is only extrinsic. It does not reach to the finer vessels, where dwells the essential quality of the organic form. The wayside weed, if by cultivation and crossing it has become a useful fruit or a lovely flower, has not undergone any essential change; consequently, as is well known, it will soon revert to its original state if left untended.

It is man alone, by virtue of his gift of rationality and liberty, who can induce change of form on the interior vessels of his being; and even he cannot produce change on the inmost vessels, the nature whereof makes him a human being with human faculties. Whatever he may make himself, he cannot cease to be a human being, though he may become a tiger or a lamb, a serpent or a dove, a brute or a true man. This is not true of animals. They cannot change their nature because they have not the power to intrinsically modify or change their organic vessels receptive of life; and influx is according to reception. Climate or environment, and to a still greater extent the influence of man, do, indeed, produce some extrinsic modification, and thus some change. But that the change is only extrinsic is plain enough from the fact that when the external influences are removed the tide of reversion at once sets in.

This point has been noticed by the famous horticulturist, De Vries, in setting forth his objections to the natural selection theory, as a preliminary to introducing his substitute theory of mutations. Variations in size, color, development, he says, are

not such as to form a new species of plant or animal; for they are not essential changes; they are nothing really or intrinsically new; they are "linear" and "quantitative" variations, but not "qualitative."

And here we are led to ask whether the theory of descent stands the test of the truth that the law of creation is still operative. Can we see any evidence of the present workings of evolution? Here the theory breaks down utterly.

Nowhere throughout the whole domain of discovered nature is there found any instance of the descent and change of species. Indeed, it would seem that the reason why Metchnikoff advanced his theory of the sudden creation of man in a single generation was the fact that no "missing link" could be discovered. Scientists have sought to prove the past existence of such a "missing link" by skulls discovered in age-long strata; but it has been shown that these skulls have all the characteristics of the skulls of many men who are well up in the scale of civilization. Illustrations have been sought in the artificial changes induced in the vegetable kingdom, but learned authorities have shown, what had always been known as a matter of common experience, that the tendency of all such "changed" plants is to revert to type; they are preserved only by the constant application of trained and experienced human intelligence. And even were it true, as is claimed by some, that there are cases where there is no reversion, yet the cases for which this claim is made are so few that the claim can have no effect on the general question. Withdraw human skill from the training of our blooded animals and our choice plants, and how long would it be before they revert to their pristine condition? Indeed, as is well known, it is this that makes it necessary to propagate many of our highly cultivated plants by cuttings and bulbs; for it is known that they do not come true to seed.

No single instance can be given of the operation at this day of the law of descent. It has apparently ceased to function. And yet the very opposite were to be expected. If nature, untended, undirected, and merely from the accidents of weather, of environment, of a lucky color to protect from

foes—if nature under these circumstances has been able to produce the almost infinite variety by which we are surrounded; if this production is the evidence of a law of descent according to heredity and environment, then how much more should we see the operation of this law at the present day, when for centuries men have given the most assiduous attention to breeding and plant culture! We should have new species indeed. We should have animals with a growing intelligence; animals in the process of becoming men. But what is the fact? Are our horses more intelligent than the horses of the Greek warrior? Are our fruits better than the delicacies of Lucullus? We have, indeed, induced changes, but only extrinsically; and we are ever under the law, not of “descent,” but of “reversal.”

This objection also has received attention by learned opponents to one or other of the numerous theories of descent; and some of the most advanced thinkers have shown the inadequacy of Darwinian evolution on this ground alone. The only answer that has been made to the objection is that the changes of evolution have required many centuries, and that our experience in cultivation and breeding extends to a few centuries only. Surely a lame answer when we consider the thousands of years of civilization. And in any event it ignores the fact that not only do we fail to produce new fixed species, even in the very limited range in which we can produce any modification at all, but that we must continually take active means to prevent reversion to the original type; for reversion is the normal law.

Moreover, there comes here the objection of the geologist and mathematician. If the growth of new species requires such length of time, what time, then, would be required to produce from simple protoplasm the infinite variety of nature? and to produce this variety not under the directing intelligence of man, but fortuitously? According to the theory of the selectionists, new species originate from a slight fortuitous variation, in a member of an existing species, by the possession whereof he has a slight advantage over his fellows, as, for instance, a slightly varied color whereby he may be better con-

cealed from enemies; a slightly fleetier foot, a slightly keener eyesight, etc. But it must be noted that for the perpetuation of this variation, to say nothing of its development, it would be necessary that it exist not in the male only, but in his mate also. And it would be further necessary, not only that the offspring should inherit the same favorable variation, but should also mate in the same favorable way; for it is only thus that reversion to type can be prevented. But, say the mathematicians, and common sense echoes their words, how impossible it is that such a chain of events could happen fortuitously; and this not in a single case only, but in the myriads of cases that would be required to produce the variety we see around us! And even supposing it were possible, the most extended estimates of the geologist as to the age of our world would not give one tithe of the myriads of myriads of years which, according to the laws of chance, would be required for the attainment of our present development.

We must also take into account the chances of the actual survival of the possessors of the variation, which is supposed to be the beginning of a new species. When we consider how slight this variation is, how slight the advantage which its possessors enjoy over their fellows, how few the variant types, and how many the normal, it must be evident that in the presumed "struggle for existence" the chances for the survival of the variant before maturity are greatly lessened. Even supposing that a slight variation should persist and increase in successive generations, contrary to all the laws of chance, still the variation will be so slight that the individuals possessing it will have no advantage over their fellows in the conflict for existence, or for mating; indeed, they will have less advantage, since their fellows would greatly exceed them in numbers.

Moreover, a single variation, even when highly developed, is not enough to give the peculiar quality that distinguishes species. The hare requires not only a fleet foot, but also keen ears and a furry coat, etc. The fish needs not only its peculiar scales, but also a peculiar formation of lungs and a peculiar formation of eye, etc. To grant the theory of descent, therefore, it would be necessary not only to grant all the difficulties

we have already enumerated, but also to grant that certain sets of variations have commenced and continuously developed in harmonious and symmetrical order! and this by fortuitous circumstances! Without this assumption, wild as it is, the developments from variations of type would manifestly lead not to the orderly, symmetrical and well-marked groups or species of organic life which we see around us, but to a wild unordered variety, with every conceivable jumble of variation in all stages of development.

It was partly to meet objections such as these that De Vries formulated his mutations theory, which traces the origin of species not to slight variations of type, but to those marked variations which, in the vegetable kingdom, are commonly known as "sports." But apart from the fact that De Vries bases his theory on very meager observations, unconvincing to a great number of biologists, it is contradicted both by common experience and by the experiments of trained observers. For it is an ascertained fact, statistically demonstrated, that in all the observed variations of nature the mean—the type—remains always stable. Variations and sports go above it and below it, to a certain limited limit, but the mean is always the standard to which they return, unless prevented by the constant exercise of human direction. This fact has been fully demonstrated in experiments on plant life instituted for the purpose. But, apart from this, it is no more than would be expected; for it is a consequence of the very nature of organic life. The causes that produce stability—that produce and preserve the type—are essential, having their origin in the form and substance of the inmost vessels receptive of life. But the causes that produce variation are extrinsic. Naturally, therefore, the type must prevail.

And this leads us to a question which the evolutionist has been unable to answer. What is the cause of variation? Climate, food, and other external conditions account only for a few variations; and these merely external, not internal; "linear" and quantitative, not qualitative. Moreover, the same variations are found in single species, all the members of which live under the same conditions. To meet this difficulty several theories have been advanced.

One is the theory of sexual selection, combined with heredity; the theory, namely, that an individual possessing a certain variation is more attractive to the female; with the consequence that the variety has greater chance of being propagated and of being developed by hereditary transmission. But the theory does not account for the fact that there is as much variety in parthenogenetic births as in others. Moreover, it is disproved by actual experiments on flies, where it was found that in the presence of many variations induced upon males the female showed absolutely no preference.

Another theory, which seeks to go deeper into the matter, has been propounded by a German biologist. He assumes that the protoplasmic beginning of the organic form consists of innumerable ultra-microscopic cells, each endowed with appetite for food. From the consequent "struggle for existence"—that is, the struggle for food—it would come about that one germ would be more developed than another; and these differentiations between the germs, combined with a difference of interarrangement, are assumed to constitute those primitive variations which are the cause of the variations that come to our view. There are variations of this theory; some hold that the development of one germ above another is due not to a battle for existence, but to latent causes, or to local situation; while others hold that the cause lies in the fact that the germs are stimulated to appetite and growth by use.

The theory is, of course, not demonstrable; and had it postulated the directive guidance of Divine Love and Wisdom, we may safely say that it would have been at once rejected by the learned world on this ground alone. Moreover, it manifestly originates not in any broad conception of a truth, but merely in an effort to meet a difficulty. And against it comes at once the objection that if the fortuituous development of germs be the cause of variation, why, then, do variations always center around a common mean or type. Moreover, it has been objected that the postulated struggle between germ cells would result in some germs being starved out, while others would develop abnormally; and since each germ is supposed to be the primitive of some special function in the body, the result would

be the birth of monsters. And the theory itself has been actually disproved by experiments—the withdrawal of food from larvae, the extraction of a large part of the yoke of eggs before they were hatched; and it has been shown that a limited food supply has no other result on the formation of the body than to dwarf it, all the organs and parts preserving their symmetrical proportions. This is also a fact of common experience in the case of underfed mothers.

Yet the theory would explain the present orderly and harmonious variety of nature as being the result of the fortuitous development of the voracious appetites of germs! and of their accidental groupings! And if, as some maintain, the germ development is along predetermined lines, we are still faced with the question as to the cause of the determination.

To meet the difficulties of the evolutionary theory, many new theories have been advanced, both as substitutes and as auxiliaries. Lamarck advanced the theory of hereditary transmission, and the consequent increase and fixing of qualities acquired by use or selection. But this is simply making quantitative modification, or modification produced by extrinsic causes, the controller of qualitative force which is the inmost force or life of the living organic form. Moreover, it leaves untouched the fact that, despite heredity, all organic forms of life tend to revert to the mean or type of their species, as seen in every modification of plant or animal life that has been brought about by the agency of man. Types and variations are, of course, transmitted by heredity, but experience indicates that this is but the effect of an extrinsic modification of the primitive life-cells, and does not effect their essential or qualitative form.

We may here add, by way of parenthesis, that in the case of man a different element enters into the question, namely, the element of free will. Man has freedom to form a character for himself, and the formation and change thus effected in the organic vessels of life goes deeper than is possible in the case of animals. Man, therefore, can actually change his nature; and the change will be transmitted by heredity. This is not possible with animals. And even with man it is not possible

to change the inmost forms of life. The vilest criminal is still a man, and his offspring has still the faculties that distinguish the human being above all the rest of creation.

Another theory that has been offered for the solution of the difficulties of evolution is the Isolation Theory. According to this theory, all variations, as the origin of species, are a matter solely of the geographical isolation of groups, and their consequent development under different environments. This position is thought to meet the objection that variations always revert to type by removing the possibility of cross-breeding. The theory does not have wide acceptance, for it is easily demonstrable that while isolation may produce, and more or less fix, a new variety of a species, it cannot produce a new species. Moreover, there is the difficulty of providing sufficient isolation to account for the infinite variety that fills nature.

Then we have the theory of sexual isolation—that is, an isolation caused by the existence of a variation which confines the mating of individuals possessed of this variation to females similarly endowed. This theory is based, we believe, on observations on albatrosses, where it was found that mating took place only between types of birds possessed of the same distinguishing characteristic, there being no intertypal mating. But in this case the species remains permanent and there is no growth in the variations, despite the intermatings. Moreover, a theory based on so slender a foundation is hardly worthy of consideration.

Deemed of greater importance, and reckoned by many as taking the place of Darwin's hypothesis, is the theory of Mutations or Heterogenesis, to which we have before alluded. This theory postulates that species arise not gradually and by the selective accumulation of slight variations, but suddenly; that there are sudden leaps of "qualitative" change; and that these leaps are due to some unknown but inherent law of development in the primitive germ-cells which occasionally finds expression or ultimates itself in what are called "sports." The vital weakness of this theory is that, even supposing that sports can form the basis for new species, which is opposed by facts, still they are too infrequent to furnish a cause for the infinite

variety of nature. Moreover, unless completely isolated, they would soon be lost by cross-breeding. The mutations theory has been widely accepted, but, as it would seem, rather in the hope that it may lead to a solution to the difficulties encountered by the evolution theory than from any demonstration of its truth. As we have already remarked, it is based on but few observations; and it has been assailed by biologists with as cogent destructive criticism on the basis of known and ascertained facts as the theory it is intended to replace or strengthen.

It must be evident to every thinking man who studies the subject, and it is acknowledged by the leaders of the learned world, that the theory of evolution or natural descent, as originally propounded or explained in any one of its various subsidiary theories, is far from furnishing a satisfactory explanation of the phenomena of nature. Every "law" of evolution that has been advanced—that is to say, every mode that has been suggested as the mode whereby evolution was effected—while serving perhaps to explain certain phenomena, is directly contradicted by a host of other phenomena. The theories put forth to meet one set of difficulties fall before a new array of fact.

And yet, despite this, the theory of descent by evolution is more firmly established in the scientific world than ever before. It is now assumed as the absolute truth on the subject of creation, which nothing can shake. But here it should also be noted that while the vulgar have not unnaturally crystallized this attitude of the learned world into a fixed belief that evolution has been effected in one certain way, leading biologists are still seeking for a theory of the mode of evolution that shall square with the facts of observation. However, this does not affect the curious phenomenon that the doctrine of descent, unsatisfactory as it has proved itself under searching examination based on experimental observation, still dominates the thought of the learned world. Though every theory as to the specific working of the doctrine has thus far been disproved, yet the doctrine itself stands firm. Take a theory or doctrine explanatory of creation, but which involves the operation of spiritual laws, the creation of all things by God-Man, and,

though it were open to fewer objections from phenomenal experience, yet it would not be even seriously considered, and would hardly be deemed worthy of consideration.

How shall we explain this curious phenomenon? One reason lies undoubtedly in the fact that the theory of evolution is the first theory of creation to come to the notice of the scientific world, as based not on theological dogmas, or mere intellectual reasonings, but on an array of facts gathered together with tireless patience and presented in a masterly way, and a most amazing array. It promised, and seemed at first to give, a purely and wholly satisfactory physico-mechanical explanation of the phenomena of nature. Moreover, it was put forward and has been received as a universal law, and not as some isolated truth with limited application; and there is a great power in universals. In the theory of evolution are universal truths that cannot but exercise a powerful influence over men's minds, especially when opposed mainly by narrow dogmatic utterances.

According to the new theory the law of creation is a *LAW*, and not a mere tenet of the understanding. It is a law, moreover, that is held to be one and the same in greatest and in least. In place of the old belief that things were simply created by a word without any necessary connection with antecedents and sequents, evolution recognizes that there is a connection of all things of creation; that the world is one unbroken chain of phenomena indissolubly connected with each other; that there is a gradual ascent in the order of creation; and that nothing is isolated or without direct and necessary connection with the whole. I do not mean that these principles were put forth in this form by Darwin and his successors—that would not be a true statement of the case. But it is undoubted that the recognition of these universal truths is involved in the theory of evolution. And it is to this fact, I think, that the theory owes much of its power to hold men's minds, despite all obstacles.

When the theory was first put forth, with its dazzling promise of furnishing the key to the riddle of the universe, it was opposed mainly from the standpoint of dogmatic theology

ignorant of the phenomena of nature—or ignoring them. The battle was bitter and prolonged; but the theologians were forced to give up their contentions one by one. The end was inevitable. The theologians were completely expelled from the scientific field. They argued, it is true, from the standpoint of the existence of God and of God's beneficent purpose; but they argued from a false theology, without knowledge of the laws of order, without knowledge of universal principles; and in the absence of these it is impossible to fundamentally influence men's minds. Now that they are defeated, their arguments are mentioned, only to be dismissed with an air of pity. Indeed, much of the educated thought of the Christian Church has gone over to the camp of the evolutionists, either tacitly or openly.

It is because the doctrine of evolution promises a rational explanation of the phenomena of creation; because it is a doctrine assuming to be based on, and confirmed by, the facts of experience; a system that is a unit, and not a disjointed set of dogmas; that proceeds from a universal thought and not from Biblical statements badly understood, and maintained against the evidence of facts, that gives the hope of being found conformable with the phenomena of nature; that recognizes the unity and connection of creation, in which the prior is a means for the formation of the posterior; that recognizes that creation was effected according to a single law and order—it is because of this that the doctrine of evolution exercises such powerful sway. And though the promise has been unfulfilled, though every new attempt to reconcile the doctrine with the increasing array and understanding of facts has failed, yet the doctrine itself remains unweakened.

But we may conclude also that a deeper and spiritual cause for this strength of the doctrine of evolution lies in the fact that it appeals to the merely natural mind. It promises to solve the riddle of creation without demanding the acknowledgment of God-Man; to explain the mysteries of life without the existence of a spiritual world beyond the reach of the senses. The promise is vain, but hope still commands belief.

THE HOMININE ANIMAL THEORY.

We turn now to the Hominine Animal theory. So far as we know this theory is confined solely to New Churchmen. It seems, indeed, to have originated in a desire to accept the theory of evolution and, at the same time, reconcile it with the doctrine of the New Church, that man was created immediately by God, and that between him and animals lies a discrete degree. The theory is that after the formation of vegetable and animal kingdoms in the way laid down by the evolution theory man was created, not by descent from an animal, but by the creation of human seed in an animal ovum, or by impregnation of an animal ovum by a human soul; the ovum thus impregnated would then grow in the animal womb and be born of the animal in the ordinary way; not *from* the animal, but *through* it.

To my mind the theory has nothing whatever to recommend it. On the face of it, it is based not on any fundamental view of the problems involved, but merely on the desire to reconcile a doctrinal statement with what is held by a godless science to be the true mode of creation. It is, moreover, directly contradictory to the earlier theory put forth by the same Swedenborg, whose doctrinal statement is nevertheless sought to be established.

Aside from this desire I can see no *raison d'être* for the theory whatsoever. It is neither scientific nor doctrinal. It receives no confirmation from the facts of observation, and it is opposed to the doctrine that influx is according to reception.

Let me say a word on this latter point. Animals are forms of affection. They are, in fact, nothing but affections incorporated and playing their part in the natural world. Each animal is, moreover, one particular affection, and whatever the exact variety induced upon that animal by environment and strengthened by heredity, the animal still remains internally the form of that same affection. It cannot essentially change this form.

Now, the ovum of such an animal can be nothing more than the form of that affection; and life, flowing into such ovum,

will be manifested according to such form. Hence "man" born in an animal ovum would not be a man, because he would lack that essential quality of man, namely, freedom and rationality for the formation within himself of any and every affection. This is inevitably the consequence of the law of influx as revealed in the Writings, and confirmed by reason. Life is one, but the forms of life are many; and variety, differentiation of quality, depends not on life, but on the various forms receiving life. It is as with the heat and light of the sun and the receptive vessels of the earth. The heat and light are one; it is variety in their reception that causes the varying phenomena of the world.

Moreover, there is something spontaneously repellant in the thought that the animal kingdom is the mother of man. And while of itself mere spontaneous repulsion can not be considered as an argument of preponderating weight, still it should not be altogether put aside, for it may well be based on a natural perception of what is in harmony with the laws of truth implanted in the soul. Our rejection, however, does not rest on natural repulsion alone, but on other grounds, which we have already pointed out.

The Hominine Animal theory is a separate hypotheses formed *ad hoc*. It is designed merely for the explanation of a single phenomenon. It is no part or application of a universal principle of creation, whether true or false—which is the strength of evolution. According to this theory, creation proceeds along the lines of evolution—whether by selection, heredity, mutation or what not—from protoplasm to plants, and from plants to animals; and then suddenly there is a change; the law ceases to operate as before, and man is created by some new law. It may be objected that this is not surprising, since man is the crown of creation; but the answer is obvious that man is an animal; and, moreover, that the law of creation is one, and proceeds according to the same order in greatest and in least. For the Divine is everywhere the same.

It is this unity of the Divine Law that gives us that clear test of the truth of a creation-theory, to which we have alluded before, namely, that if a doctrine expresses the true law of

creation, that doctrine can be confirmed by the evidences of the same law still at work creating at this day. Existence is continual subsistence; or, the law of creation is the law of subsistence.

But where do we find evidence that the animal kingdom is the mother of man? When we talk of mother-nature, our mind contemplates the vegetable kingdom, not the animal. True, man lives on, is sustained by animal flesh. But aside from the contention that man is not naturally a flesh-eater, it is plain that the animal kingdom is not necessary for his existence; is not his nursing mother. Not so, however, with the vegetable kingdom. In this kingdom we spontaneously recognize the mother of our body, without whom we could not for a moment continue on earth.

No! there is not a single consideration that has come to us, that recommends this curious Hominine Animal theory, the offspring of an unnatural union between a godless science and a doctrinal tenet.

THE MOTHER NATURE THEORY.

But when we come to the theory set forth by Swedenborg in his *WORSHIP AND LOVE OF GOD*, a very different view opens before our eyes. This theory presents us with one law of creation by the Love and Wisdom of God-Man; a law universal in its application; true in greatest as in least, in the creation of a worm as in the creation of man; a law whose operations are in evidence in our present sustentation. It presents creation as a whole, gradually ascending from the lowest forms of life to man, and implanting in the lower forms the conatus and effort to assist in the creation of the higher; a law, in fine, that is the unfolding of that universal truth revealed in the Scriptures, that God formed man from the dust of the ground and breathed into his nostrils the breath of life.

Swedenborg's doctrine of the creation of organic forms is set forth *ex professo* in his work the *WORSHIP AND LOVE OF GOD*, where he lays down in detail the special application of the law to the creation of man.

Man, in common with animals, he says, was created by means of the vegetable kingdom. The noblest tree of creation

brought forth an ovum; this ovum was impregnated by seed formed by life clothing itself with the quintessential and most perfect spheres of the world; and thus man was formed from the dust of the ground and became a living soul.

Such in briefest outline is the doctrine of Swedenborg; a doctrine which, so far as I know, is unique in the philosophical world. The biologist may smile at this doctrine as pure speculative theory. Yet he deceives himself both in this and in the implied estimate of the theories that have been put forward in support of evolution. These latter are indeed speculative; thought out, not as conclusions of a universal principle of truth, but as means to explain the difficulties of the evolution doctrine. Few perhaps realize how much of mere theorizing there is in the learned world on the question of the beginning and growth of organic life; and it was with a view to emphasizing this fact, that I have so frequently pointed out the theoretical nature of the arguments adduced to support that doctrine of evolution which is commonly thought to be so firmly established on the basis of proof.

Swedenborg's theory, on the other hand, far from being light or amusing, if seriously examined, will be found, I think, to be the only doctrine of the creation of organic forms, that is, at once, in agreement with the facts of experience, satisfactory to the rational mind, and in harmony with the acknowledgment of the Divine Love and Wisdom of God-Man.

But, in all fairness, the theory should not be viewed as an isolated doctrine. It must be seen as what it really is, namely, the culmination, the embodiment, the fruition of Swedenborg's whole system of philosophy. Indeed, it is so closely knit with this philosophy that if we deny the one, we necessarily invalidate the other.

The WORSHIP AND LOVE OF GOD is manifestly the gathering up into a single universal conclusion, of all the principles that had been formulated by a Christian and philosophic mind, on the basis of inductions drawn from a rich abundance of experimental observations.* In the WORSHIP AND LOVE OF GOD he

* The WORSHIP AND LOVE OF GOD was the last of Swedenborg's philosophical works; the fruition of all his previous writings on

applies these principles to the creation of man, and then, advancing further, to the creation of a truly rational and spiritual mind in man which shall be a "city of God," the end and crown of creation.

The universal principle which runs through all Swedenborg's philosophy, the principle from which his teaching respecting the creation of man is a necessary consequence, is that creation proceeds from firsts to lasts, and that the work of formation commences in lasts. To New Churchmen it is unnecessary to say that this is the doctrine of creation given in the Writings. It is not so well known, however, that it is the principle of the philosophical works.*

The doctrine itself is universally true—true in its application to the creation of the universe by God-Man and equally true in its application to the formation of the least thing by man. Whatever we do,—form—create, is first present in the mind as an end, a purpose. And in this end or purpose is present as

chemistry, cosmology, physiology and psychology. It embodies and chrystallizes the whole product of that period of his life during which he was prepared by the Lord by means of natural philosophy to become the medium of Divine revelation. With this in mind, and recognizing the harmony between his philosophy and

the doctrine revealed to the New Church, we may see the significance of the fact that when he compared this work with Scripture, he found entire agreement; and also of the fact that he was told by spirits that his WORSHIP AND LOVE OF GOD was a "divine book."

*The fact of Swedenborg's recognition of this principle, seems to furnish us with the reason for the sequence of his great philosophical works. First comes the *PRINCIPIA* where he treats of the formation of atmospheres whereby Divine Life may inflow. Then come his works on mineralogy, or the kingdom of matter. Following this he takes a sudden stride, in his physiological and psychological works, and advances to the study of the soul in

its influx and operation in man. In these works he indicates that he will treat also of the vegetable kingdom, but, if this was his intention, it was not carried out. It is as though if we understood the kingdom of the atmospheres, and the nature of matter, and at the same time comprehended the operation of life, or the soul, in the human body, the rest,—the operation of life in the other planes of matter—would be clearly deducible.

in a living image, the whole of the deed or effect. This is involved in the "visualizing" of a thing desired, before we proceed to its accomplishment. The next step is the influx of the will, the end, into the body and its muscles, inspiring these with the ability to secure the materials whereby the deed visualized may become actual; finally comes the actuality itself, which is brought about by the will seizing hold of the materials thus gathered, and fashioning from them an image or realization of its end or purpose. Thus the will or love proceeds from firsts to lasts, and in lasts commences the work of formation.

The same thing is true in the creation of an infant. First is the soul; the soul derives from the mother's blood, as from its own kingdom and possession, all the materials necessary for the formation of its body. And when this body, this material ultimate, is fully formed and born into the world, then the soul, flowing therein, proceeds to build up its more perfect work, the human mind with its will and understanding.

So likewise in the creation of the universe. God first created atmospheres as the mediums of forces, that is, of life proceeding from Himself. By these atmospheres becoming more and more dense* inert and dead matter was at last created, as the materia, the mother, as it were, of all created forms.

The necessity for the creation of dead matter lies in the essence of Divine Love which is to give to others outside Itself. This gift can be bestowed only by the previous creation of particles which in themselves are dead, inert, lifeless. For from such parts, compound forms can be formed, which, as new and compound forms, can receive life, and can feel that life as a new life and as their own. It is, in fact, only on the basis of dead matter that any formation can take place; and the thing then formed derives its quality, and consequently its form, not from the matter, but from the form. Thus a wooden table is not wood, but a table. But with living created forms they not only derive their quality from their form, but they have in greater or less degree a sensation of that quality,

* Here is not the place to speak of the means by which the atmospheres were created and became more and more dense. The

matter is specially dealt with in Swedenborg's *PRINCIPIA* and in the *DIVINE LOVE AND WISDOM*.

that is, of the life which has formed them from inert matter. Plants, animals, man, are all formed ultimately from inert matter. But this matter is wonderfully compounded and formed, and in the compound form, living from the Divine Former, there is the presence of, as it were, a new life. Something dead in itself has been compounded and fashioned, and the new compound form is animated; a life, as it were, of another is begun. Life is thus given to others by Him, Who alone lives. Plants have an obscure sensation of this life, animals have a clearer sensation, and man enjoys not only full sensation, but also perception, as though the life were his own.

Following the guidance of this universal law of creation, we may see that after the existence of matter—the universal *mater* or mother of all created forms—came the creation of organic forms; and that these were created by the will of God-Man, acting upon basic matter by means of the atmospheres which are, as it were, the fingers of God, and within which is contained the Life of God, proceeding from Him. First comes the action of the air with its moisture, playing upon matter, and producing the first colloidal substance, the primitive protoplasm presenting the first and simplest compounded substance capable of being animated by life from God-Man; the first ovarian substance, as it were, which is to be impregnated that the primitive forms of organic life may thus be created.

The impregnation itself must be effected by the life of God proceeding by means of atmospheres; for it cannot be effected by matter. Matter can do no more than furnish the clothing for life. It can no more make life than can the food that enters our mouth, make mind.

But atmosphere alone, or force alone, cannot produce form. It must be clothed with substances drawn from the earth; and thus be present on the earth in a form adapted to act upon the matters of the earth.

The case is the same in the animal body. The food that is taken into the mouth must be acted upon by the soul in order that it may be assimilated and formed into the flesh and blood of the body. But the soul cannot act upon this food directly. It must first clothe itself with the finest substances of the body,

and it is by means of these that it operates, to act upon the elements of the food, as seed in its ovum, that the human body may be born as the offspring of the union. So in creation. For the creation of organic forms of life there is necessary not only an ovarian plasma that shall form the body, but also a created seed inclosing life; that life may thus act upon the plasma to form therein and therefrom an image of itself.

And here let me pause for a moment to note a vital principle laid down by Swedenborg in his law of creation; a principle hitherto unknown, but which requires but to be stated in order to be seen. The principle is that matter is not wholly dead, in the sense that it has no use, except to be acted upon; it is not absolutely passive—indeed, an absolute passive is an impossibility in the nature of things. From its very origin, from the latent qualities which are within it by virtue of its constitution from living atmospheres or forces, matter has the desire, as it were, to clothe forms or uses. Something of this truth was indeed seen by Aristotle when he wrote that “Matter desires form, as the female the male.”

When we prepare materials for a definite purpose—say to build a house—the end for which we gather them is present in every stage of their collection. So in the Divine creation of matter. But the presence of this Divine end is actual in matter, in that matter is nothing but the final compression of atmospheres which in their turn are the successive media for the proceeding of Life from God, for the proceeding of End, of Use. Hence within all matter there is the latent potency and tendency to clothe the uses intended by God-Man; a potency which is, as it were, the use of matter. It is from this latent quality that all matter, from its internal activity, gives off a sphere, and this sphere is, as it were, its thanksgiving to God, its offering of itself for His service in the building of His kingdom.

The spheres thus given off by matter, are the finer materia which can be seized hold of by the active atmospheres; and with which they can clothe themselves and thus form little centers for the ultimate embodiment and exercise of their activities, their uses, upon the earth. It is thus that primitive seeds

were formed; to be implanted in the primitive colloidal substances framed from the salts and oils and water of mother earth.

The same principle is true in every stage of the upbuilding of creation. The new matters that are produced by the organic forms of life have also this innate tendency; and the organic forms themselves, give off spheres—the active substances of interior nature—that can serve for the formation of seeds for the production of higher forms of life.

The first seeds of creation were produced in this way by the last of the atmospheres in which the Life of God-Man is immediately present.* For the creation of seed is according to the universal law of creation, and must begin with the lowest forms of seed, before the higher can come into existence. It is by the impregnation of primitive plasma by seed thus created, that the primitive forms of vegetable and insect life were produced upon the earth; or, what is the same thing, they were created by life operating upon matter, duly prepared and latently eager to clothe, operating upon matter by means of spheres, also duly prepared, as an intermediary. This is, indeed, the law of propagation now active. For in the animal kingdom the ovum and the seed are both formed ultimately from the matters of the earth; but the one is formed into an ovum to receive and clothe life; the other is formed into seed to serve as a medium for the transmission of life; and the life will manifest itself according to the form and substance of this, its first clothing.

By means of the primitive creations of the lowest organic forms something new is produced or born into the world—new matter, and also new spheres of substances, or new activities. This is manifest enough. Flesh and blood with their odors, which are nothing more than our perception of the living activities continually proceeding from them, can be produced from the gross matters of the earth, only by means of the animal kingdom. The soil or humus, without which none of the higher forms of vegetable life can exist, is produced originally from the remains of organic life. The bodies of organic

* According to Swedenborg this is the ether of the world.

forms of life were thus offered for the service of the Creator, that they might furnish a new and richer material and ground for the clothing of higher living forms of use.

It can also be demonstrated experimentally that new and distinctive activities are born into the world by means of organic creations. For cases are known where a substance formed by the vegetable kingdom is exactly the same, according to every known chemical test, as a substance of the same name which is found in the inorganic kingdom. And yet, when examined by the spectroscope, the two substances are found to be interiorly different. In the one the ray of light is turned in one direction; in the other it has a contrary twist. And this difference in interior structure and organization means a difference in activity, a difference in use.

By the creation of the lowest organic forms of life, there come into existence new materias, new spheres of substances, new forms of uses. From the new materia can be formed by the activity of life acting through living atmospheres, new plasmas, new ovarian receptacles; and from the new active spheres can be formed new seeds, or new and more perfect media for the inbreathing of life. Thus creation ascends step by step, in one continuous order and according to one law, from the lowest forms of life to the highest; and at each step the lower exists for service to the higher, offering itself, as it were, in gratitude to the Creator for the furtherance of His Divine work.

The one law is true in every stage of creation in its ascent from lasts to firsts, from matter to the kingdom of heavenly souls. Every new creation is but a step in the ascending series; and every preceding form lays down its life, as it were, for the sake of the higher forms that follow.

We have some illustration of this growth of perfection in the ascending series of creation, in the modern institutions now established in our midst. Take, for instance, the growth of art and science. In primitive times man was under the necessity of preparing rough tools for the production of forms which would embody the conceptions of his mind. And as these forms were produced and their uses realized, new planes

were formed in the mind, new spheres of thought, as it were, with which the soul could more fully clothe itself, and thus give to the man new conceptions, new ideals. For the ultimatum or realization of these, the primitive tools would be used for the fashioning of finer tools, and more delicate mechanisms. And thus would be formed a new creation; a creation that acknowledges the soul as its father, and ultimate matter with its increasing perfection as its universal mother, whereby the ideals implanted by the soul in the human mind can be born into the world, in ever-increasing perfection, as the wonderful creations of art and science. What else is this process but the descent of the spiritual—the descent of life from God—into the world of matter; to there clothe itself according as the clothing is prepared? What else but the operation through human minds of that universal law whereby God-Man created the world—a law which is impressed on the order of the world in its every progression? The law of creation is one in great-ests and in leasts.

It is according to this law that God-Man created matter, and that He clothed the End or Use of His Divine Love with matter, in order that He might thus create a world of growing perfection, wherein might be formed human beings to whom He could give of His Love. Man can do no more than fashion the matters of the world to be dead images or representations of his living ideals. But God-Man is Life itself, and all that proceeds from Him and is created by Him lives. But, as with the uses created by man, it lives solely for the fulfillment in greater perfection of the crowning work, an angelic heaven from the human race. "For God so loved the world that He gave His only begotten Son (that is, the Divine Life Proceeding as atmosphere) that whosoever believeth in Him (that is, receives of this life) may have life everlasting."

Following the thread of this law of creation, we may see that the first and simple organic forms of life served for the creation of new and more perfect materia, and new and more subtle spheres; and that thus, on the one hand, new ovarian plasma could be produced, and on the other, new seeds for its impregnation. And so, in series after series, the vegetable

kingdom and the lowest forms of insects and water-animals came into existence.

The vegetable kingdom is not a form of affection; that is to say, the soul and life, or the use, of the individuals of this kingdom is not an expression of affection. Plants, unlike mammalian animals, are not living, breathing forms of affections; but they are forms of service or use for the sustenance of affections. This is manifest; for plants exist for the production of uses whereby affections may be stimulated and gratified. Hence we have the teaching of the Writings that the soul of vegetables is Use; or that each member of the vegetable kingdom is a form of some use proceeding from God-Man.

Applying this principle to the process of creation, it follows that as the vegetable kingdom is perfecting, it produces forms or uses that can serve for the creation of the animal kingdom, even as the vegetable kingdom now produces from matter forms or uses for the continual sustenance of the animal kingdom. Or, to speak more concretely, the vegetable kingdom produces the ovarian plasma that can serve as the womb and nursing mother of animals; and gives off active spheres that can be seized hold of by a more active and interior atmosphere, for the creation of seeds which shall be living forms of affections. Thus the animal kingdom comes into existence—drawing its body from the vegetable kingdom, but its soul and life from seed newly created.

That there is a gradation of spiritual forces, or life, as modified by atmospheres; that is to say, that Life from God, flowing through and tempered by one atmosphere, will produce lower forms of life, such as the forms of uses of the vegetable kingdom; while the same life, flowing through a higher and more active atmosphere, will produce higher forms of life, such as the forms of affections which constitute the animal kingdom, may be illustrated by the heat and light that proceed from the sun. In themselves heat and light are uncreatable. They are simply forms of activity. But activity proceeding from God-Man is variously modified according to the atmospheres whereby it flows; and by the same law it is variously presented, and

variously effects its work on the plane of matter. In itself, however, it is the one and uncreate Active.

Now, this activity or heat and light operating by the air produces merely external effects. The same activity, or heat and light operating by a higher medium, produces those interior activities in organic forms, which enable the forms to maintain their state and order of life—as, for instance, in the sap of vegetables and the blood of animals. But there is a still higher medium for the operation of heat and light upon substances formed from the earth; a medium whereby they produce in those substances the warmth of affection and the light of perception.

Granting, then, these three planes for the exercise of activity from God-Man as the Sun of Life, it follows as a rational consequence that in the process of creation these three planes become successively incorporated for operation on the earth; the first in the form of external operations on matter; and the two latter as organic forms which are created in the degree that the materia for their formation is provided.

Here we have the ascending principle of creation. First, matter; then the operation upon matter by the lowest living atmosphere proceeding from God-Man; and thus the creation of seeds of the lowest vegetable forms, and so on to the more perfect. Then from the vegetable kingdom, by means of the activities of a higher atmosphere, comes the creation of the animal kingdom, the kingdom of affections, the kingdom where the forces of life are set forth to view as living forms of affection.

And now we are prepared to properly consider Swedenborg's doctrine of the creation of the first man; for as to his body man is animal. According to Swedenborg, and in full harmony with all his philosophical principles, the animal kingdom, or at any rate, the kingdom of mammals, was created by the direct agency of the vegetable kingdom. Animals originated not as full-fledged forms, but as seeds, created when the suitable materia for their creation was at hand, and nurtured in a suitable ovarian substance. The materia for the animal seed was furnished by the spheres of the vegetable kingdom; for

these spheres, delicate and vibrant and active in the conatus to clothe higher forms of use, could be seized hold of by the higher atmospheres with their activity for the creation of forms of affection; and from the conjunction of spheres and atmospheres, of substances and force, results animal seed—living ultramicroscope forms of affections of various kinds, according to the nature of the spheres offered for the clothing of life.

Nor should this mode of creation of seed seem surprising. The spiritual forces of the higher atmosphere are incumbent on the earth; that atmosphere is vibrant with life, which from the love of God-Man is in the perpetual effort to form itself, to create, that it may enter upon the earth, to there perform its part in the supreme work. Furnish only the suitable ultimate for the operation of this life, provide only the suitable materia, and creation must result, first in the interior sphere of nature, in the form of seed, and then, by seed, in her outer courts.

The case is similar here with the Divine Will, which is the Life of the universe, as it is with human will. Grant that a man from will is in the effort to do a certain work—for instance, to express himself in music—then that will, being in the perpetual effort to create, requires but the presence of means for its actual ultimatum. Furnish the soul of music with an instrument and the result is certain; and the more perfect the instrument, the more completely will it clothe and manifest the music of the soul.

Indeed, the creation of seed in animal bodies at the present time is effected in precisely this way. The creative soul is present in both male and female; but it is only in the male that suitable materia, prepared by the secret laboratories of nature from the dust of the ground, is offered for the service and clothing of the soul as seed; and it is only in the female that the dust of the ground can be formed into an ovum to receive and cherish this seed. It is the soul that forms both seed and ovum. Man cannot create living seed. He can merely prepare the clothing, or rather can take some part in this preparation. And the soul, receiving from God-Man the conatus to create, to perpetuate itself to infinity, seizes this materia and thus establishes new beginnings of life.

The law of creation is one and eternal. The law that operates now is the law that operated in the beginning of creation; and the life that forms human seed now was in the same effort to form human seed then. The materia only was at first lacking; even as it is lacking in the male before maturity, when no seed is formed, though the soul is fully present and in the effort to produce new forms of life.

But in primitive creation there were no animal forms by which the fruits of the vegetable kingdom could be absorbed, digested, purified and finally prepared in secret laboratories for the service of animal life. Therefore, according to Swedenborg's doctrine, this use of furnishing the materia for animal seed was performed by the vegetable kingdom direct by means of spheres. And as the individuals of this kingdom were more perfect and their spheres richer and more complex forms of use, so could they serve for higher forms of animal life.

The ovarian substance, the plasma, the womb, for the reception of the vital animal forces thus clothed for birth upon the earth, could not be formed from the mineral kingdom direct, nor could they rest on the bosom of that kingdom. For the nourishment of animal seed there is required protection from the air, and the favoring influence of the inner heats of nature; and these can be supplied only in the secret labyrinths of organic nature. We see some illustration of this in the fact that while the seeds of insects and fish can be cherished in eggs exposed to the influences of air and water, the seeds of mammals require a resting place wholly removed from the world, and hidden in the inner courts of nature, that the more complex and delicate work of nature may be undisturbed.

Thus we are led to the philosophic reason of Swedenborg's position that the primitive ova for the reception of the seed of mammalian forms of life were built of a more perfect plasma which could be formed only by and in the bosom of the vegetable kingdom itself, as its fruit, its offering to the work of God-Man. The ova thus formed were impregnated with the seed created by incumbent life, and thus were animals born.

Thus also was born not only animals, but primitive man, the most perfect of the animals. But for the most perfect work

the most perfect means were required. There must first be the perfecting of the vegetable kingdom; the perfecting also of the animal kingdom; that from the quintessence of the spheres thus produced may be provided materia of such perfection that it could be laid hold of and fashioned, not by the Life of God flowing through the atmospheres of nature, but by that Life proceeding directly from Himself as the Sun of Life.

Man is indeed an animal, with the tastes and desires of animals; he is the most perfect of animals, for he can acquire the gifts of all animals. But he is more than an animal. He is a being not only of the natural world, but also of the spiritual. For he can lift up his thought above the sphere of this world, above its objects and their delights; and can contemplate and love spiritual things. Hence, different from all animals, his head is erect and his gaze is naturally fixed, not to the earth, as is the case with animals, whose head is prone and whose eyes are directed to the object of their affections, but to heaven.

The seed of man, like the seed of animals, needs also for its creation materia drawn from the earth. Life which is the soul of man cannot create human seed without means; otherwise no earth would be necessary, and the fable of the theologians that angels were created such would be true—a fable without rhyme or reason and wholly unconnected with any philosophical principle or rational thought. And what can this materia be but that which it now is—the quintessence of the offerings of the world, the perfection of its spheres, a perfection not approached until all previous forms of life had been created to give directly and indirectly their share in the production of this crowning work of natural creation. Even as seed is now formed, not from the gross substances of earth, but from those finest substances, which exist in the form of spheres, and which are taken in continually by the pores of the skin.

Thus, then, man is born of seed immediately created, and implanted in an ovum provided as the choicest fruit, the crowning work of the vegetable kingdom, and necessarily of the noblest member of that kingdom; some noble tree in the primitive paradise. And here let me remark, lest I be misunder-

stood, that when I speak of the separate creation of seed, I do not mean separateness in a physical sense; that is, I do not mean that seed was prepared in one place and was afterwards carried over to the ovum. The preparation of seed in wonderfully compounded and enswathed forms is rendered necessary by virtue of the fact that it must be conveyed by a long road from its first laboratory to the ultimate ovum. But in first creation this conveyance would not be necessary. The ovum exists, is ripe, is ready and waiting for its welcome guest. Life from God-Man operative, ever in the will to clothe itself that it may give of itself to others—this Life will operate so soon as the quintessential materia, through which alone it can operate, is at hand. This materia being composed of the finest things of nature, that can penetrate everywhere; and operating by means of it, can thus act directly upon the ova formed from the dust of the ground, to breathe into them the breath of life. This is, indeed, actually the process of impregnation at this day. Eliminate the clothing of the seed and its unclothing, and attend only to the operation that takes place in the primitives of the ovum; is it not clear that this operation consists in the action of life upon the nucleolus of the ovum merely by the intermediary of the finest substances of nature.

In this way then, was the creation of man effected, as taught by Swedenborg's philosophy. He was created by the same law by which all organic forms were and are now created, and, essentially, in the same way in which animals are now created or born. And after creation, while still in his infantile age, the first man had at hand the breast of his nursing mother, the fruits, as it were, the milk, of his parent, which he appetized by instinct, and by instinct knew how to procure.

For Swedenborg's philosophy approaches the philosophy of evolution in one respect, in that it teaches that the first men were born almost like animals. Consequently, he adds, like animals, they were born with all the connate instincts and knowledges necessary for their care and sustenance. This position is a necessary consequence of the whole line of reasoning respecting the creation of man. The first men were indeed complete men in respect to their possession of a human soul

with human faculties infinite in their possibilities. But otherwise they were less perfect than the generations that followed. The materia first provided for the creation of human seed—materia derived from the vegetable kingdom—was less perfect than the materia subsequently provided by the human kingdom itself. It was less perfect, because it was the simple form of use; a form in which had not been developed any of those human qualities, those intellectual and voluntary traits, which the possession of a human soul makes possible, and the cultivation and existence of which distinguishes the life of man from that of animals. Hence the first men created, were almost animals, except that they had the potentialities of men. The seed from which they were created, being devoid of any self-derived quality such as men acquire for themselves by the exercise of their freedom, served as the absolutely obedient medium for the operations of the soul; and hence the body that was created, with all its appetites, was created into the order of its life. The man desired nothing, sought nothing, but what was desired by the soul in its unhindered influx into this virgin body, as yet devoid of self-cultivated qualities, and lacking all inheritance of them.

But in succeeding generations, the materia given for the formation of human seed became different in nature—either more perfect or more imperfect. By life in the world men acquired for themselves individual qualities, individual voluntary and intellectual characters. And these qualities were impressed on the materia provided for the formation of seed in male human beings; and became the gifts of heredity bestowed upon their offspring. So far as the qualities thus acquired and transmitted, were heavenly and in accordance with the order of human life, so far were the offspring born more perfect and more fully able to live and develop a truly human life. Thus man, from being born almost an animal, became more and more a man. If, however, the qualities acquired and transmitted were evil qualities, qualities contrary to the order of life, the effect on the seed and its offspring would be to make it, in that degree, less perfect. The materia given for the soul's weaving would be in a gyre and form opposed to the order of life; with

imperfections, with tendencies to diseases; and almost devoid of those instincts which, in animals, flow spontaneously from the soul, since animals are in the unperverted order of their life. For many thousands of generations, evil qualities have been hereditarily transmitted to all offspring. Hence at this day no man is born into the order of his life; and consequently none is born with that instinct, flowing from the soul, whereby he could know his food, and thus provide for his sustenance, spontaneously. The opposite is in fact the case. For men now are born more weak and helpless than any animal; and without the care of others they would inevitably perish. But it was not so in the beginning.

Let me now review and extend the application to our doctrine, of the truth that the law of primitive creation is the law of creation and sustentation at this day—a truth to which we have so frequently adverted.

How are men created and sustained today, both as to their bodies, and as to their minds? It is by this same law. Human seed is formed or created from materia received from the vegetable kingdom, and more particularly, from the finest spheres of the world, elaborated and refined in the secret laboratories of nature, and proffered to the soul for its weaving. Considered in itself, the formation of seed is but a form of spontaneous generation. Life or the soul is present seeking to create; the human body but offers the materia, and creation is at once effected.

After man is born he is still sustained—that is, the materia for the continual creation or sustentation of his body by the soul, is still provided by nature, whom he spontaneously reveres as his nursing mother. And the endearing term, far from being a mere allegory, is the statement of a scientific and philosophic truth. For nature, the vegetable kingdom, is actually the mother of man's body; the womb, as it were, into which are gathered all the riches of the world, that the man may choose and take for the building of his body.

But the operation of the law of creation by the preparing of the dust of the ground for the vivification of the breath of life, does not stop here. By the same law, man's mind also is

formed—the law that influx proceeds from firsts to lasts; and that in lasts commences the work of upbuilding successively more perfect forms or planes, that firsts may be more fully manifested.

The new-born infant has, as yet, no mind, no will and understanding, but only the potency to these. Before will and understanding can be formed, the infant must receive from the world sensual images. These enter his mind as a new materia, formed, as it were, from the dust of the ground. And the soul, operating upon this materia, thus drawn from the world, breathes life into it and thus creates ideas and imaginations. At first these are gross and imperfect. But as, by the increase of sensual experience, they grow in perfection, they, in their turn, form a new ground, as it were, wherein the soul can operate for the formation of the more perfect fruits of this human paradise, rational thoughts and affections; and these in their turn clothe themselves in new creations—the rational and actions and speech of the body. Here we see the same universal law of creation, the preparation of ultimates from the world, as the wombs for higher births; the quickening of these ultimates; and the formation from them of superior mediums for the ever-perfecting work of creation.

We see this law operative also in the human race as a whole. For men were created in ignorance, but by the accumulation of experience they have acquired a ground in which could be implanted the germs of the arts and sciences, of philosophy and religion.

So universal is the application of the law that to trace it would demand that we enter not only into cosmology, but also into physiology, psychology, theology. But here we must be content with the above brief survey.

It may be objected to Swedenborg's doctrine, that it is merely a theory and brings no facts of experience for its support. But this is not quite the case. For aside from the fact that with Swedenborg himself the theory was the finition of multiplied inductions drawn from countless phenomenal observations in the field of mineralogy, chemistry and physiology, it is also supported by the circumstances based on common ex-

perience, to which we have already alluded. It is a fact that we are formed in the womb of nature; that nature is our mother who continually sustains our body, while our mind lives above nature. It is a fact that the ground which serves as the soil for the vegetable kingdom has been prepared only gradually and by the growth and decay of countless myriads of plant forms, which, in their death, have furnished the materia for the formation of higher forms of life. It is a fact that our mental development proceeds along the lines indicated by this doctrine of creation. It is a fact that men and animals live not only by gross food taken in by the mouth, but also by the spheres with which the auras are filled, and which are taken in through the pores of the skin; and it is a fact, not difficult to demonstrate, that these spheres furnish the finest nourishment for the service of the soul.

Still these considerations, these facts, are few and meager in the view of the scientific mind, which has accumulated countless facts of observation in its testings of the theory of evolution. What such a mind demands is little short of the actual demonstration of the process whereby man was created. Yet it has been obliged to confess the impossibility of such demonstration—at any rate up to now. And it has been forced to the formulation of theories and hypotheses assuming the existence and operation of substances beyond the power of any microscope, and of forces whose operations do not become manifest except in the region of ultimate effects.

It may indeed be questioned whether the law of creation can ever be directly demonstrated by phenomenal experience. Such experience must indeed be accumulated, that from it may be gathered the laws of nature as seen in her more external operations; and then with these as our guide, we shall be enabled to infer as to her secret operations, whose actuality is hidden from us in the sacred recesses of her temple. Here nature is invisible. We can see her operations only in lower spheres when they come before the microscope and the senses; and even then we can see but little. The key to the understanding of these operations will not and cannot be forged from sensual experiment directly or alone, but only indirectly

by the formulation of principles based on experience, and drawn forth by a truly rational mind.

Some may find it easy to accept the reasoning which led Swedenborg to his conclusions as to the creation of man, but difficult to visualize the actual creation as he describes it. But let such persons endeavor to visualize any of the other modes of creation that have been put forward, and he will meet with the same difficulty; but increased by a spontaneous feeling of repugnance. It would seem, indeed, that the very nature of the subject is such that the creation of man can never be visually grasped by the sensual man, but must be seen by the reason and then confirmed by observation. Consider rationally the hypotheses that have been advanced, and then contrast them with the philosophy of Swedenborg. Will you not see that the latter is the only doctrine that can stand the test of examination; the only doctrine that offers a solution to the riddle of creation, that is at once in harmony with God's Word, and in accordance with the principles of rational judgment.

But much remains to be done that we may more clearly see the doctrine itself and its application. Much oil must be burned before we can fully confirm this doctrine and present it in complete form. Consider how many thousands of students have bent their efforts to testing the theories of evolution; the myriads of observations and experiments; and yet with how meager a result so far as the arriving at a rational explanation of the work of creation. And then consider the fact that few know of Swedenborg's philosophic principles, and fewer still accept them. What shall we say would be the result if the same energy, the same skillful and exact observation, the same acute thought, had been devoted to the investigation of these principles, that has been devoted to the study of evolution; to the seeing of the operation of God-Man in His creation, that has been given to the proving of a godless and mere mechanical universe? In the present fewness of our numbers we must be content to support the doctrine largely by rational considerations, supported by such facts as can be gleaned from the investigations of others. But the time will come when men skilled in observation and rational deductions

will bend their talents to the investigation of this doctrine in the light of modern knowledge. Biologists will arise inspired to see the operations of God-Man in the universe, to see the full application of those genuine principles which led Swedenborg to the formulation of this concrete theory. Instead of striving to build up and establish a purely chemico-physical theory of creation, they will bend their efforts to see the presence and operation of Divine Love and Wisdom in all the works of nature. And it is easier to confirm the existence of God than to deny it; for all nature is eloquent in His praise.

Contrast the two tasks! On the one hand, to reduce all things to the plane of sensual demonstration and the judgment of sensual experience; on the other, to assemble the riches of experience before the judgment seat of enlightened reason! On the one hand, to see only the material world with its natural forces; on the other, to trace the operations of the spiritual world in the natural! On the one hand, to prove that the essential element in the perfecting of the world was deadly and bitter conflict and the survival of the fittest; on the other, to show that every lower form of creation was brought into being for loving service to higher forms, and that to this service the lower forms give their spheres and their very life as their song of praise to God! On the one hand, to see in the marvellous harmony of nature, merely the operations of chance, or of laws undirected by Love and Wisdom, disconnected from beneficent end or purpose; on the other, to behold the world and the universe as a theater representative of the Divine, a universe whose every least part bears testimony to the Love and Wisdom, the Order and Providence of its Creator, God-Man!

NEWS NOTE.

MEETING AT BOSTON.

In connection with the meeting of the General Convention, members and friends of the SWEDENBORG SCIENTIFIC ASSOCIATION met together at Boston, Mass., for the purpose of hearing the President's Address and the Annual Reports, and of promoting the interests of the Association.

The meeting was held at the 20th Century Club on June 24, 1921. Mr. Hite, as President, called the meeting to order at 10 a.m. After the Rev. Everett K. Bray had been appointed to act as secretary, the President read his Address, as delivered at the annual meeting on May 27. This was followed by the reading of the reports of the Treasurer and Editor as given to the same meeting.

In the discussion that followed the uses of the Association were dwelt upon, and emphasis was placed on the necessity of securing a wider support for these uses. The Rev. John Whitehead, after alluding to the early history of the NEW PHILOSOPHY, which he had established many years ago, and which he had afterwards turned over to the SWEDENBORG SCIENTIFIC ASSOCIATION, expressed the hope that the Association would so strongly press its work before the Convention that every one would feel it his duty to become a member.

There was some discussion as to the policy of the Association with regard to devoting a large part of the NEW PHILOSOPHY to the translation of Swedenborg's works. In this connection it was voted as "the sense of the meeting" that, in future, the NEW PHILOSOPHY "be devoted more fully to publishing articles calculated to create general interest in Swedenborg's science." The translations now in progress were endorsed, and the meeting advised the securing of the matter already set up, by purchase of the type.

A motion was passed encouraging the publication of a Swedenborg Primer, and another to the effect that a committee of three be appointed by the President to arrange for a similar meeting next year.

Prof. Very then read a paper on Swedenborg's Philosophy of Heat and Light. At the end of the reading some questions were asked, after which Mr. Whitehead read his paper on Series and Degrees.

The meeting adjourned at 12:50. The attendance was about 40, and the interest throughout was warm and active.

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER WITH
SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

(Continued.)

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MALEBRANCHE *De Veritate*.

Willing is a property which ever accompanies the mind, whether the latter be united to the body or disjoined therefrom. Nevertheless it is not essential to mind, since it supposes thought, and the mind can be conceived of as existing without will, like the body without motion. . . . Will is nothing else than an impression made by the Author of Nature, which carries us to good in general (L. III, C. i; [p. 179; 1 Eng. Bk. III, p. 4]).

Will, simply as will, depends essentially on the love whereby God embraces Himself, on eternal law, in a word, on the will of God. We love a thing only because God loves Himself; and unless God loved Himself, or unless He continually impressed on the human mind, a love like to His own, that is, that motion of love whereby we are affected towards good in general, we would love nothing, would will nothing, and therefore would be without will. For the will is nothing else than an impression of nature whereby we are carried towards good in general (L. V, C. i; [p. 310-1; 2 Eng. 2]).

Affections are not free; and they are in us without our consent; and the assent of the will is all that depends absolutely on us. The perception of good is naturally conjoined with a motion of the love; with a sensation of love; with an emotion of the brain and a motion of the spirits; with a new motion of the mind which augments the first motion of the love; with a new sensation of the mind which augments the first sensation of love; and finally with a sense of the sweetness which rewards the mind when the body is

in the state in which it should be (L. V, C. iv; [p. 328; 2 Eng. 27]).

We must not suppose that the will rules over the intellect any otherwise than by its desires or motions; for the will has no other action. Nor must we believe that the intellect obeys the will by producing in itself the ideas of the things which the mind desires; for the intellect never acts at all; it only receives light, or the ideas of objects, by virtue of the necessary union which it has with him who includes all entities in himself in an intelligible manner (*Explicat*,* ad L. I, C. ii; [p. 19; 2 Eng. 377]).

DES CARTES.

What I call the actions of the soul, are all our wills; for we know by experience that they come directly from our soul, and they are seen to be dependent on it alone. So, on the other hand, all the species of perceptions or knowledges of which we are found to be possessed, may, in general, be called its passions; for it frequently happens that our soul does not make them what they are, and it always receives them from the things that are represented by them. (*De Passion*. Pt. I, Art. xvii.)

Our wills again are twofold. For some are actions of the soul which are terminated in the soul itself, as when there is a will to love God, or, in general, to apply our thought to an object which is not material; while others are actions that are terminated towards our body, as for instance, when, merely from having the will to walk, our legs move and make progression (*ibid.*, Art. xviii).

When our soul applies itself to imagining
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something that does not exist, as for example in conceiving of a magic palace, or a chimera; and also when it applies itself to the consideration of a matter that is only intelligible but not imaginable, as for example in the consideration of its own nature; the perceptions of these things which it then has, depend principally on the will which makes them to be perceived. Therefore they are usually considered as actions rather than as passions (*ibid.*, Art. xx).

* Malebranche appended to his work *De Veritate Inquirenda* a series of "Illustrations or Explana-

tions" designed further to explain certain of his conclusions. It is this appendix that is here referred to.

SACRED SCRIPTURE.*

John said, Bring forth fruits worthy of amended life (Matth. iii, v, 8). Every tree which bringeth not forth good fruit is to be hewn down and cast into the fire (vers. 10). Blessed are the merciful for to them shall mercy be given (Matth. v. vers. 70),†

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SENSE, SENSATION.

ANDR. RYDELIUS, Doctor.

The SENSES are external, internal and inmost.

The *external senses* are five, and by them experience is acquired. Their perception is internal and is carried on in the mind. Every sense is a kind of touch. The points to be considered are the organ, the object, and the mode in which it affects the soul. . . . The external senses are corporeal, by modern authors, therefore, they are referred to the impure intellect; likewise the internal senses, but not the inmost. . . .

The *internal senses* are imagination and memory. See *Imagination and Memory* [p. 38].

The *inmost or mental sense* is intelligence, and a good mental taste; but see *Mind and Intellect*, p. 13.

The intellect is not a sensation but a representation.

Common sense is the reflection of the mind whereby the diversity of sensations comes to a unit. This reflection and animadversion pertain to the reason.

The senses ought not to aspire to that which pertains to the intellect; as for instance in experimental physics, where the external senses and the imagination are more cultivated than pure and architectural reason. At this day we wish to perceive hardly anything. Thus the senses cleave to matter so that they care for nothing else; but their reason is only an active imagination. Hence arise foolish hypotheses.

It were ridiculous to wish to define, and demonstrate what I clearly sensate; as for instance the nature of a colour.

* Castello's version.

† In the MS. this paragraph is referred to on p. 24 above. crossed out; the same passages are

There is nothing in the intellect, says Aristotle, which was not previously in the sense.

There is no disputing what one sensates, because it is not a matter of the intellect; sensations frequently persuade us that things are what they are not. For instance the same food is appetising to one man and loathsome to another; to the former it is good, to the latter it is evil; and in respect to external beauty, or *mode*, the European loves a white face, the Moor a black. There is no disputing with anybody as to taste. The giant and the dwarf have different sentiments in regard to weight; what is light to the one, is heavy to the other; what is pleasing to one temperament is displeasing to another.

It is not easy for one to persuade himself in respect to a thing which he does not possess. It is not easy to pity another, when oneself has not been ill, because the reason does not perceive his evil plight. The inexperienced believe that all things are easy. The knowledge of oneself involves much.

No one rightly knows himself, unless he has acquired this knowledge from sensation.

AUGUSTINE.

If we sense all that we see, and suffer all that we sense, then we suffer all that we see (*De quant. Animae* c. xxiii).

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ARISTOTLE.

Every sense seems to be the sensation of a contrariety. For instance, the sight is a sensation of white and black; the hearing, of the sharp and the grave; the taste, of the bitter and the sweet. In the sense of touch, however, there are many contrarieties, the hot and the cold, the dry and the moist, the hard and the soft. . . . There is in the voice, high pitch and low, loudness and softness, smoothness and harshness, etc. In color there are other differences. . . . It would seem that we sensate sound and color and odor, in a single sensory, and that sight and hearing [and smell] are a single sense; though the medium by which the motions are effected is a separate thing. . . . Every sensation is effected by an intermediate.* . . . In the sense of touch, flesh is

* This sentence does not occur in any Aristotelian MS. It is found only in a paraphrase of *De Anima* by Themistius.

the interjected medium. . . . To sensate is to suffer something. Therefore, when an object makes the sensory like to itself in actuality, it does this because the sensory is like it in potency (*De Anima* L. II, c. xi; [II 37E, 38ABC, 39DE; Hicks 98-9, 103]).

In regard to all the senses, it is necessary to assume that sense is that which is receptive of sensible forms apart from matter; just as wax receives an imprint [of an iron or gold ring, apart from the iron or gold. It receives the golden or bronze impression] but not by reason of its being bronze or gold. So likewise the sense in respect to anything, is passive to that which has color or taste or sound. . . . Sense is not a magnitude but is a certain ratio and faculty thereof (*De Anima* L. II, c. xii; [II, 40BC; Hicks 105]).

Without touch no other sense is possible in man. But this sensory is not of the earth or of any other element. It is quite clear, therefore that this is the only sense the loss of which would necessarily mean the death of the animal. . . . Therefore superabundance in tangible things destroys not only the sensory, but also the animal* (*De Anima* L. III, c. xii [II 59CE; Hicks, 161, 163]).

PLATO.

It would be absurd if many senses were seated in us, and they were not all gathered together and concentrated in one form or soul, or by whatever name it may be called, by whose force or potency, by means of them as instruments, we sensate all the things that come under our senses (*Theaetetus* I 184D [I B421]). The faculty of sensation is the faculty of sensating esse and non-esse, similitude and dissimilitude, identity and difference, and one or more in respect to number (*ib.* 185 [CD; I B. 422]).

WOLFF in *Psychologia Ration.* [On the Faculty of Sensational.]

The sensations of the soul are representations of a compound in a simple (§ 83, 84).

* In the words immediately preceding this last sentence, and which are omitted in the quotation, Aristotle states that other sensibles than things tangible, such as color,

sound and taste, if in excess, do not destroy the animal, but only the individual sensory which they affect.

An image is in general, some representation of a compound (§ 85). Sensual ideas are images (§ 86).

A material image is a representation of a compound in a compound; an immaterial image may be said to be the representation of a compound in a simple (§ 87). Pictures are representations of a compound on a surface (§ 88). Sculptures are representations of a compound in a solid (§ 89). Material images represent things within themselves,* (§ 90).

Sensual ideas are like the object which they represent (§ 91). Sensual ideas represent only figure, size, situation and motion (§ 92).

If in the things that we perceive, we distinguish figure, size, and motion, the sensations are distinct (§ 93). Otherwise the sensation is confused (§ 94). If a number of confused and partial sensations enter into a compound sensation, they produce an entire distinct sensation (§ 96). When we sensate, the soul represents to itself the intrinsic mutations of simple substances, but confused into a unit (§ 98).

The soul, by her sense, even when fortified with glasses, is not able to distinguish derivative corpuscles (§ 99); and still less primitive corpuscles (§ 100); or the elements of material things (§ 101). Nothing

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that is within material things can be perceived by the sense wholly distinctly, nor, in the nature of things, can it be investigated by the sense (§ 102).

From the representation of the connection of things, which depends on the internal state of the elements, arises the sensual idea of space (§ 107). When the soul perceives the force of inertia, it confusedly represents to itself the passive principle of elements (§ 108).

When the soul sensates, the motion impressed by sensible objects is propagated by the sensory nerves all the way to the brain (§ 111).

From now on, we shall call the motion impressed on an organ

* As, e.g., a statue, by the arrangements of its parts, represents a man.

by a sensible object, an *Impressed appearance*;* and to the motion propagated therefrom to the brain, or springing therefrom in the brain, we shall give the name *Material idea* (§ 112).

In the brain, material ideas coexist with sensual ideas (§ 113). To individual sensual ideas answer individual material ideas (§ 114). If the impressed form is the same, the material idea must also be the same; but if the impressed form is different, then the material idea must also be different (§ 115). If the same material idea is excited in the brain, the same sensual idea is born in the soul; and contrariwise, (§ 118). If it happen that the same material idea is excited by divers sensible objects, the sensual idea must also be the same; and contrariwise (§ 119). If the sensory organ is constituted in the same way, and the same sensible object has the same relation to the organ, the material and sensual idea must also be the same; and contrariwise (§ 122, 123).

If the motion impressed on the sensory nerves is swifter, the sensual idea is clearer, and contrariwise (§ 125). If a deformed visible image is delineated in the eye, the visible idea is distinct; if no image is delineated, it cannot be distinct (§ 130). The ideas of visible things are explicable by means of their images delineated in the eye; that is, from those images a reason can be given why visible things are presented in such way and no other (§ 131). If a motion is impressed by diverse sensible parts on diverse nervous fibrils, the sensual idea will be distinct (§ 127). If a thing cannot impress motion on the nervous fibrils, it is not perceived at all; while if the impressed motion is too sluggish, it is hardly perceived, even obscurely (§ 129). If the image delineated in the eye is clear, the visible idea is clear (§ 132). If the images of the individual parts of a visible object of which its image is composed, are clear, there is a distinct visible idea; as they are less clear, so it is less distinct (§ 133). If the image in the eye is obscure, the visible idea is also obscure (§ 134).

If the sensible force is greater, the sensation is stronger (§ 136). If two sensibles whose forces are signally unequal, act simultaneously upon the same nervous fibrils, the idea of the stronger sensible prevails (§ 139). If the lights of two visible objects acting

* *Species*, appearance or form.

simultaneously upon the same nervous fibrils, are very unequal, the idea of the visible object that sends the greater light into the eye ought to prevail (§ 140).

If the sensory organ is destroyed, material and sensual ideas wholly cease, or the soul is no longer able to perceive by sense the sensible things of its organ (§ 143). If for any cause the sensory organ is rendered wholly unfit for its function, material and sensual ideas cease (§ 144). Supposing then a man who is blind by nature, no material and sensual idea of a visible object can have place in such a man (§ 145).

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If one be deaf by nature, no material and sensual idea of audible sound can have place in that man (§ 146).

If the same sensible thing acts into different sensory organs, the material and sensual ideas are different (§ 149). If two qualities are necessarily together in the same sensible, it is possible to recognize by one sense, qualities that regard another (§ 150).

If by the soul's decree, the position of the body is changed on account of foreseen sensations, the sensations depend as to their actuality on the liberty of the soul (§ 151).

The perfection of an image consists in its likeness to the thing of which it is the image (§ 154). Because sensual ideas are like to the object which they represent, sensual ideas are perfect (§ 156). The likeness of sensual ideas is said to be patent when the soul recognizes them; on the contrary we call it latent, when it does not recognize them, or when what is, in fact, present, is not apparent (§ 157). In sensual ideas, so far as they are distinct, there is a patent likeness (§ 158). In sensual ideas, so far as they are confused there is a latent likeness (§ 159). Distinct sensual ideas are more perfect than confused (§ 160). The sense is more perfect in the degree that it represents things more distinctly (§ 161).

The most perfect of all the senses is sight. In respect to ordinary use, hearing is more perfect than touch; and taste and smell are more imperfect than the others (§ 162). By touch one may discern plane, rectilinear, curvilinear, and mixtilinear figures (§ 176). In discerning shape and size, the use of the touch is

far removed from the use of the eye; or, the use of touch is narrower and more restricted than the use of the eye (§ 177).

The sharpness of a sense is either intrinsic or accidental. It is intrinsic when the clear and distinct perception of a thing which, by its natural constitution of the organ, was perceived only obscurely or confusedly, depends on an internal cause. It is accidental when this depends on some external cause (§ 269). The keenness which sight acquires by the telescope and microscope, is only accidental (§ 270). By an ear-trumpet, the hearing is plainly sharpened (§ 273); this sharpness is accidental (§ 274).

(To be continued.)

THE BRAIN.

BY EMANUEL SWEDENBORG.

(Continued.)*

241. The promotion and balancing of these forces, both the external and the internal, seems also to be contributed to by those granules spoken of by Pacchione and Ruysch, which are between the above-mentioned fibres and membranous expansions, and sometimes in crowded abundance. These granules seem to be complicated bases or ends as it were, by whose help, force and elasticity are restored to the fibres and lacerti; hence they are not present in all subjects in equal abundance, mass, situation and figure. That they are muscular forms, thus conglomerated and concentrated, has in a measure been shown above; and it is now again apparent, [1] From the fact of their being disseminated between the above-mentioned roots of the cords, both within and without the sinus. [2] From the extension of the filaments proceeding from them, even to beyond the tunic and into the dura and pia maters,—which threads are supposed to be lymphatics. I say into the pia mater, because, according to the same author, [Paccione] the surface [of the pia mater] is veiled over by a kind of white cloud and covered with something like vapor. [3] Also from the fact that they resemble mobile corpuscles, which exist in great number, either in the falx or in both meninges; for all the vessels whereby the blood is to be promoted into the sinus, or even the other accompanying tendons, can regard these corpuscles as centres, to the end, namely, that they may be justly held in their natural state. And because a compound force is required for action upon a compound, therefore a congeries of these cor-

* The subject is the Longitudinal Sinus. In what precedes, it has been shown that the cerebrum acts upon the sinus, by means of the falx and dura mater, in such way that when the cerebrum expands,

the sinus is constricted, and *vice versa*. It is now being shown that by reason of its cords, membranes and muscular granules, the sinus is in the effort to constrict.

puscles is engirded with its own proper membrane which communicates with the common internal membrane of the sinus, and with its membranous expansions; by which arrangement, is produced the common, and at the same time the particular effect that is to enter into the blood, the cells and the veins.

242. 108. [III] *In what way the blood is derived into this sinus.* This may be concluded to some extent from the anatomy of the active parts; to wit, that there is no violent intrusion of the blood through the intervening vessels, but rather a tranquil invitation into the sinus, thus intrinsically dilated. For it is well known from physics that when a hollow body is opened up by some force, in respect to its walls, the liquor flows in through the communicating pipes spontaneously, being urged by the auras, which never permit anything to be empty or unfilled. As the sinus is opened by degrees, so, by the same degrees, the blood flows in from the veins in order to fill up the space. For all the vessels, whatsoever they are, and where-soever, seem to be simultaneously opened according to the disposition of the arteries and veins, or according to the economy of the blood of the cerebrum. And since the longitudinal sinus is the greatest of these vessels, and is also in the extremity of the vessels of the cerebrum, therefore, when this sinus is thus amplified, they all seem to derive their waves to this point; and at the same time are all filled by the carotids. This matter will come to be further confirmed in the following section of the present Transaction, on the subject of the Arteries and Veins. Meanwhile, an examination of the falx, the dura and pia meninx, and their vessels, reveals no trace of a violent compression of the venous blood into the sinus, but evidences only a simultaneous expansion of all the vessels, and such an arrangement in their state of expansion, that the blood can pass through them with the utmost freedom. The vessels passing from the pia meninx to the dura and the falx are reduced from a complex situation to one that is more direct, and hence are allowed free passage. While the veins are held in the pia mater, in the state of the cerebrum's compression, they are greatly amplified, being shortened and assuming a figure as of a hemicycle, though they are afterwards drawn out more

straightly ; but when they are in the dura mater, through which they run for the space of a finger's breadth before being committed to the sinus, they are opened as to both their dimensions ; for, according to the descriptions, such is the way in which they are acted upon by the layers of fibres, and at the same time by the sinus which divides the two layers of the dura mater, and draws them to itself, both above and below. In the systole of the sinus, however, every path is closed ; for then, according to RIDLEY, the two layers of the fibres of the falx and dura mater are like a common valve. Add to this, that in the state when the sinus is enlarged, its cells, both the small lateral cells and the larger cells of the fundus, are opened, and by these the blood is admitted. For when the sinus is contracted from without as to length, and drawn open as to breadth, these cells are stretched out from the fissures, into a kind of oval figure. Moreover, the membranous expansions, the radical fibres of the cords, and the tunics of the muscular granules also contribute to the same effect from within. Therefore neither the cells nor the lateral apertures are protected by valves, but only the lower apertures ; lest, when the sinus comes to the state of its compression, the blood be impelled into the veins. This blood can never go through the lateral apertures into the dura mater, since the veins leading in this direction, being of themselves closed and twisted, do not transmit a single drop ; hence they are not furnished with valves.

243. The fact that there is no violent expulsion of the blood from the arteries to the veins, and from the veins to the sinuses, but rather a spontaneous invitation, seems to derive its origin from the circumstance that when all the vessels of the cerebrum are in the state of their compression, or in systole, the blood is expressed elsewhere than to the cortical substance, which draws off the whole of that essence that is to pass through the fibres into the nerves. If, at this time, the passages leading from the arteries to the veins and from the veins to the sinuses were to stand open, all the blood would be expelled in this direction, and the principal substance would be deprived of its purest blood ; yet it is for the sake of this substance that the blood is attracted to the cerebrum. There-

fore, in the state of the arteries' compression, or, what amounts to the same thing, in the state of the cerebrum's expansion, the passages between the arteries and veins seem to be closed; and that part of the blood which is within the veins, to wit, that which has been invited thither by the common expansion of all [the parts], seems to be the only part that passes into the sinuses. The veins, therefore, seem to be formed, to the end that the blood shall not be sent back from them into the arteries, as from one artery into every other. The same law seems to obtain in respect to the blood in the dura mater; it would seem that it must first be taken up by the veins before it is derived into the sinuses. A clear examination of these particulars brings to light the reason why the veins of the cerebrum, running through the dura mater from behind forwards and from in front backwards, when they insinuate themselves [into the mater], are for the most part flexed—in complete coincidence with the action of the sinus itself, or of the cerebrum upon the sinus.

244. 109. [IV] *In what way is effected the expulsion of the blood from these sinuses into the lateral sinuses.* This is evident from what has been mentioned above. For when the cerebrum acts upon the sinus, and when, simultaneously, the cords of Willis are stretched, and, together with them, the fibres themselves, and consequently the tunic, both in particular and in general [this result follows], the same force is also excited by the lacertae and fibres, and by the muscular granules situated on the outside, and which communicate with the internal parts. Therefore, the force of the cerebrum is the principal active force, and the force proper to the sinus itself is an accessory or secondary force. By means of this latter, the inferior cells are closed with valves, and the lateral cells are drawn into an impenetrable fissure; or the passages are otherwise confounded; so that not a drop of blood can slip in, but all the liquor is pushed on through the orifice opening into the lateral sinuses. In the direction of this orifice, moreover, the tunic of the longitudinal sinus itself increases in thickness and strength, and its cavity becomes more ample.

245. But when this sinus is held in the state of its expansion,

then also the passage into the lateral sinuses is closed. For both within and without there are muscular fibres.

it were, which are extended crosswise and obliquely; and when these act simultaneously, they close every aperture—as is evident from a careful examination of these fibres.

246. 110. (V) *Between this venous sinus and the veins of the body there is this difference* that the sinus is tunicated in an entirely different way, in that, it does not enjoy a muscular, and still less a nervous tunic which acts upon the muscular. In place of this, it has a tendinous, membranous and fibrillary tunic dependent, to some extent, on the membranous expansions, which in their turn are dependent on the lacertous threads and muscular granules arranged on the inside and outside of the sinus and which communicate with the pia meninx. Consequently by this means there exists a communication between the cerebrum and the cords. There is also the further difference, that the arterial blood is not expelled into the veins, and from the veins into the sinus, as is the case in the body; but flows spontaneously into all these vessels, which are opened by the force of the active cerebrum; and finally, by means of the accessory force of the sinus itself, is expelled into the lateral sinuses. Hence the influx of blood from artery to vein, and from vein to sinus, cannot be called successive, but simultaneous; being such, that when the one vessel receives its liquor, the other also receives its; and—

(12 leaves or 24 pages are here missing from the manuscript.)

257. 121. . . . the cerebellum itself likewise,—whose inferior or anterior surface is discriminated into protuberances, or into provinces distinguished by the direction of the ridges. Of these provinces, the larger ones, which on both sides are subjacent to the transverse vermicular processes, are ploughed up into a number of parallel folds which run through it in a transverse direction and insinuate themselves into its structure. In their natural volution, they seem to be insinuated more deeply on the right side than on the left; from which it follows that the right part of the septum, being more strongly and profoundly agitated, turns the blood running through it above the

sinus, with its superior orifice and canal, to the right rather than to the left. And since the par vagum nerve runs from the aforementioned protuberance of the cerebellum, as will come to be confirmed in the Translation on the Nerves, there is therefore a subordination of all the parts directed by the cerebellum itself, all the way to the right auricle of the heart.

258. 122. Meanwhile, lest the equilibrium be destroyed, when the blood-stream of the cerebral surface is poured into a sinus and vein of one side, the fourth sinus, with all its blood from the interior of the cerebrum, is drawn towards the sinus and vein of the other side, and thereby the flow is equilibrated. Moreover, a short transverse sinus is sometimes found running between the two lateral sinuses, in order that any super-abundance of blood may flow back. So, in like manner, from the right jugular vein a small branch descends obliquely to the left, where the latter inosculates with the subclavian; to say nothing of other communicating veins on the way. By this arrangement the defect of the one is supplied from the excess of the other, wherever there is an uneven proportion, whether in respect to quantity or to quality.

259. 123. In addition to the above arguments, we have also the prudence of nature, ever foreknowing, as it were, and providing all that is suitable to her kingdom; her prudence, namely, in that she has made provision to transmit the drier blood immediately towards the auricle of the heart, this transmission being effected, as was said, by means of the right jugular vein; while that blood which is not yet so deprived of spiritous humor and vitality, she transmits to the other or subclavian vein, in order that it may at once meet the newly arrived chyle which is drawn up to this subclavian vein or to the left jugular, through the thoracic duct. For the blood which pushes from the choroid plexuses through the fourth sinus, and which, for the most part, is emptied into the left jugular, is not so much deprived of life as that which has exanimated itself in the cortical substances. The equilibration of these bloods in respect both to quality and to quantity, seems to be what is provided for by the above-mentioned anatomases.

260. 124. Omitting this last reason, it will still be evident,

from the considerations mentioned above (for there is a subordinate ratio of all effects from their efficient causes), why in man the vena azygos presses upon the right side and not upon the left;* why the right lung and the right side of the diaphragm exceeds the left in mass and expansion; and why the pylorus, with the duodenum, the gall bladder and the liver occupy the right side. All these circumstances fall in with their causes when it is granted that the lungs respire when their muscles, the costal as well as the other respiratory muscles, are in action; or when the thoracic nerves and the great intercostal, drawn from the whole of the medulla spinalis, contract the muscles; or, when the medulla spinalis, by its elevation and expansion, acts upon these nerves; or when, together with the medulla spinalis, the medulla oblongata, the cerebellum and the cerebrum are also in animation; in a word, if we grant the synchronous action of the lungs and brains.

CHAPTER V.

FOURTH SINUS.†

261. 125. The fourth sinus of the dura mater, or the sinus called by Herophilus the Torcular,‡ runs from the region of the pineal gland, where is formed the interstice between the extremity of the corpus callosum, the nates, the testes and the cerebellum, or from the inner angle where the falciform process initiates and enters into the transverse septum of the medulla oblongata. When this sinus has radically laid hold of the veins and inosculated with them, and frequently with the double choroid plexus; and after it has simultaneously, on the way, joined to itself the inferior longitudinal sinus (when this is present), it emerges into light, from a deep crater, as it were, or from the center of the cerebrum. Thus this sinus, charged with all the blood of the interior cerebrum, that is to say, with the blood of the cineritious substance and perhaps

* In the manuscript this part of the passage is emphasized by the note "N. B." in the margin.

‡ *Torcular*, the Latin word for a "wine press."

† Now called the straight sinus.

also of the medullary (within which the cineritious is sometimes enclosed in stellular fashion), with the blood of the choroid plexuses of the three ventricles, and with a part of the blood of the fourth, if we leave out the small portions which run through the falciform processes of the dura mater towards the superior sinus,—this sinus, resting on the cerebellum, runs out by an oblique path, to the place of junction of two or three sinuses in the surface, at the central bone of the occiput, and empties the blood which it carries, either into the end of the superior longitudinal sinus, or into one of the arms thereof, which bends to one or other of the lateral sinuses, or into one of the lateral sinuses themselves. In this sinus, as in the first superior,* the dura mater is sometimes observed to be duplicated or thickened.

262. 126. The fourth sinus, says VIEUSSENS, returns the blood from the deeper parts of the cerebrum. [Its orifice is seen at the place] where the longitudinal sinus goes off into the lateral. There it receives the fifth sinus which occupies the lowest region of the falx. . . . The little venous channels which come down from the cineritious and inner substance of the cerebrum, and from its anterior ventricles, and likewise those which, after coming from its fourth ventricle, climb over the convex part of the cerebellum, all tend towards the fourth sinus, and go to form it. (*Neurographia*, Lib. I, c. ii in 2 Manget, *Bib. Anat.* 117, 118.)

263. The fourth sinus, says RIDLEY, arises from the inferior portion of the falciform process at that point where it becomes continuous with the second process† of the dura mater; and a large double vein belonging to the choroid plexus, together with the fifth sinus‡ (when this is present), enters into it, in the interstice formed between the extremity of the corpus callosum, the nates, the testes and the cerebellum. From here, having first passed over the cerebellum, it finally comes with the other three sinuses to that place of union which, from its first discoverer, has always preserved the name torcular Herophilii. (*Anatomia Cerebri*, V, p. 43.)

* The Superior Longitudinal.

† Now called the tentorium.

‡ The Inferior Longitudinal.

264. WINSLOW describes it as follows: Around the place where the superior longitudinal sinus is concurrent with the two lateral sinuses, is seen the opening of the fourth sinus, which is sometimes double. Throughout the whole of its extension this canal is enclosed within the union of the falx and the tentorium. It does not always open into the end portion of the longitudinal sinus; it sometimes ends at the commencement of one of the lateral sinuses, when the bifurcation is not equal or symmetrical, and it is frequently found to inosculate with that lateral sinus which appears to be an arm of the common trunk of the superior sinus and of the other lateral sinus. . . . Its diameter is not considerable. It forms a kind of bifurcation with the inferior longitudinal sinus and with a vein of the cerebrum, which is sometimes double and is called the great vein of Galen. (*Expos. Anatomique*, Tr. de la Teste, 44-45.)

265. In one subject, says MORGAGNI, the straight sinus ended in the middle of the transverse canal, between the two lateral sinuses, in a single orifice; in another subject, it ended in a double orifice; which sinus, in still other subjects, I have frequently seen to terminate in the left lateral sinus near its beginning; for I have not always, nay, nor even in most cases, observed its opening in the extremity of the longitudinal sinus. . . . Once also I remember having seen this sinus doubled like the longitudinal sinus. In this latter, frequently in many places, sometimes in one only, he has seen a duplicature formed by a peculiar wall attached interiorily to both sides, and extending, for some space, sometimes to the distance of two fingers' breadth. (*Adversaria Anat.* VI, Animad. i and vi, pp. 3, 8, 7.)

The reader may see the outlet of this sinus in figures IV and V of Ridley's [*Anatomia Cerebri*]; in Table VII of Vieussens's [*Neurographia**]; and in one of Morgagni's figures,† and also in one of Pacchioni's.‡

* Also in Manget, 2 *Bib. Anat.*, Tab. LXII, fig. 1.

† Adv. Anat. VI. Tab. I, fig. 2.

‡ In Pacchioni, *Epist. ad Schroekium*, and in Manget 2

Th. Anat. Tab. XCII, fig. 3. This figure finely illustrates the point in question.

266. 127. Making comparison with the sinus of the falx, and with experience as our guide, we may learn what is the action of this sinus upon its blood, and what the influx of the blood into this its sinus. The first thing noticed is, that in the state of the expansion of the cerebrum and cerebellum, this fourth sinus is narrowed in respect to its whole breadth, and extended in respect to its length; or, is constricted in respect to both dimensions; so that it expels the whole of its blood through the superior aperture. This takes place when the cerebrum and cerebellum are incumbent on the quadruple transverse septum, and this on the falciform process; from which situation results an effect which is concentrated in the central point or concourse where this canal runs. The cerebrum touches the sinus slightly and only in two places; in the commissure of the processes about the sinus is an unevenly triangular foramen, which is acuminate during the expansion of the processes. The rest of the sinus is occupied by the cerebellum in whose mass and subjacent bosom it lies. Therefore, when the brains are expanded, it is everywhere compressed; and the blood which it contains is pressed out as by a wine press (torcular); consequently it is pressed from a considerable belly into a tube and, if we may venture a conjecture, into a tube that is somewhat triangular, the acute part whereof looks to the falx.

267. 128. At the moment of the expansion of the brains, this sinus is also stretched lengthwise; for all the radical veins which bring to it their blood, seem to be stretched more straightly;—like that vein, sometimes double, which arises from the choroid plexuses and passes over the third ventricle; and also like the little radical veins in the thoracic duct; for both the ventricle and their duct then become fissures, and are closed; so likewise the inferior longitudinal sinus which runs through the lowest border of the falx; and also the other veins. Hence room is afforded for the sinus also to extend itself, like the sinus of the falx. But because an exit stands open above, under the occipital bone, it is seen that the sinus can be produced no further in that direction. We may therefore be allowed to infer that it produces its interior tunic in that direc-

tion, and spews out the blood with rolling lips, as it were; almost as is done in the intestines and other orifices, through which their contents are generally expressed by a rolling of the orifice. For this reason we must suppose that the tunic is sometimes duplicated, that it may evolve the liquor from the viscus successively. This also is a consequence following from the external compression of the brains into a canal of a conical figure; and from the abundance of cortex which occupies this portion of the cerebrum and cerebellum from top to bottom. Hence it is a force, both external and internal, belonging to this sinus, as to the falx, that impels the blood outwards.

268. 129. The same thing happens here, as in the sinus of the falx, to wit, that when the brains are in their constriction, the blood flows into it not by force but spontaneously; for by reason of the brains being constricted and collapsed, this sinus is swollen into a tumid cone and belly; at the same time, also, its radical veins are expanded, which by reason of the yawning ventricles, the third and the ventricle emitting water, are drawn into a kind of curvature. Hence all stands open, from arteries to veins; and from veins to this last cavity of the interior cerebrum, the way of passage is free. The holding of this passage open all the way to the margin, is contributed to by the lacertous and almost fleshy robust substance which exteriorly surrounds the sinus and which, according to the descriptions of MORGAGNI and PACCHIONI, everywhere emerges therefrom, even from the triangular foramen. A greater force is required here, because it must be opened by a force which corresponds to all the vessels of the interior cerebrum, from which a tract of blood, as it were, successively flows into this open sinus; but still each vessel has in addition its own proper force, administering to itself. But, so far as I have seen, the nature of the connection between the lacertous substances and the septum on the one hand and the interior tunic on the other, has not yet been unravelled by experience.

269. 130. In the diastole of this fourth sinus, therefore, all the conduits,—the venous and the arterial, those that lead into the cineritious substance of the beginnings of the medulla oblongata, and those of the medulla itself, those of the cerebellum

and also those which lead into the choroid plexuses,—all are held patulous and pervious. But in the systole of the sinus, that is, in the expansion of the cerebrum, all the passages between the arteries and veins of the interior cerebrum and between the veins and this sinus are closed; nor is anything held open except the two extremities, namely, the cineritious substance itself and the ultimate passages of the choroid plexuses; that is, the secretories and excretories on the one hand, and the orifice of the rolled-back sinus on the other,—exactly as was said in respect to the sinus of the falx. But of these matters we shall speak more in detail below; for they stand in need of demonstration.

(To be continued.)

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NOTES BY THE EDITOR.

The arrival in this country some two months ago of bound volumes of the phototyped manuscripts of *ARCANA CELESTIA*, *ADVERSARIA* and *INDEX BIBLICUS*, which have been received by the *ACADEMY OF THE NEW CHURCH*, the *GENERAL CONVENTION* and the *AMERICAN SWEDENBORG SOCIETY*, and presumably also by the *ROTCH TRUSTEES*, marks the commencement of the final winding up of the great undertaking commenced in 1910, when a number of New Church publishers, including a representative of the *SWEDENBORG SCIENTIFIC ASSOCIATION*, met together in London in connection with the Swedenborg Congress. All the volumes of the phototyped manuscripts due the American bodies have not yet been received, but it is probably only a question of a short time before each of the bodies has its proper share of these works.

The undertaking contemplated by the meeting of New Church publishers at the rooms of the London Swedenborg Society in 1910 was the final completion of the work of reproducing the theological manuscripts of Emanuel Swedenborg. A small part of this work had been done many years previously by Dr. R. L. Tafel in his *PHOTOLITHOGRAPHED MANUSCRIPTS*; but it may surprise our readers to know that more than one half of the photolithographed volumes issued under the editorship of Dr. Tafel consists of scientific and philosophical manuscripts. The only theological works reproduced in that series were two volumes of the second draft of the *APOCALYPSE EXPLAINED* and one volume of *MINOR THEOLOGICAL WORKS*, the total comprising 1,474 pages. Later, about 1906, under the editorship of

Mr. ALFRED H. STROH, the *SPIRITUAL DIARY* was phototyped in three volumes, comprising 1,796 pages; and still later, in 1910, the *INDEX BIBLICUS* was phototyped in three volumes, comprising 2,040 pages. The last-named work had been undertaken prior to the meeting in the summer of 1910 by the LONDON SWEDENBORG SOCIETY, acting on its own responsibility; but at the meeting in 1910, Mr. John Pitcairn, on behalf of the ACADEMY OF THE NEW CHURCH, undertook to purchase a part of the edition. We believe that the whole work was actually produced prior to the summer of 1910, but, for reasons which are not clear to us, the bound volumes were not delivered until two months ago. At the time of the 1910 meeting there were still remaining unreproduced the *ADVERSARIA*, *ARCANA CELESTIA* (first draft), *APOCALYPSE EXPLAINED* (first draft) and several minor works, including Swedenborg's *Theological Correspondence*. It was to arrange for the reproduction of these manuscripts, which would complete the list of Swedenborg's theological writings, that the committee met. According to the plan finally determined on, the work was to be completed in five years' time, but, owing to a variety of causes, including Mr. Stroh's illness, and then to the coming of the war with all its disastrous consequences, the work of phototyping was very greatly delayed. The stage of completion now reached was arrived at two years ago, but further delay was occasioned in securing materials for the binding and in shipping the work.

The volumes as we now have them do not quite complete the series contemplated in 1910. The work thus far done includes the *ADVERSARIA*, three volumes; the *ARCANA CELESTIA*, five volumes; *APOCALYPSE EXPLAINED*, three volumes; and *MISCELLANEOUS THEOLOGICAL WORKS*, one volume (not complete), comprising a total of 9,395 pages.

The portions still remaining unreproduced, and which were to be included in the volume last mentioned, are: Swedenborg's *Theological Correspondence* and *Sundry Notes*, *Memorials*, *Errata*, etc. Some of the correspondence with Dr. Beyer has been phototyped, though from our inspection of the negatives in Stockholm it appears that either only portions of certain letters

were reproduced or that some of the negatives have been lost or mislaid. The latter contingency is the most probable, for it is inconceivable to suppose that Mr. Alfred Stroh, under whose superintendence the work was carried on and who is so justly esteemed for his accuracy, would have photographed only portions of a letter. It still remains, therefore, for the bodies of the Church to complete the reproduction of Swedenborg's theological manuscripts. But this part of the work is the most difficult of all, since the letters to be photographed are scattered in many depositories. However, negatives have been secured of a large number of them, and if some determined effort were made by a competent person and supported with financial aid, one summer's work would be ample to complete all that yet remains to be done.

The bodies of the New Church may well be proud of their record in the reproduction of Swedenborg's works,—an undertaking first initiated in the GENERAL CONVENTION under the leadership of BISHOP BENADE some fifty years ago. At present the reproduced portions of the Swedenborg manuscripts comprise 16,746 pages of the reproduced manuscripts. The details may be seen from the following table:

	Pages of Reproductions	Pages of Original Manuscript
Schmidius Bible.....	755	755
Prophets and Psalms.....	25	25
10 Vols. Photolithographed.....	3,897	5,441
Spiritual Diary.....	1,796	2,280
Index Biblicus.....	2,040	2,413
12 Vols. Phototyped.....	8,233	12,154
	<hr/> 16,746	<hr/> 23,068

A comparison of the number of pages of the theological manuscripts reproduced under the editorship of Mr. STROH with the number of pages reproduced in the ten photolithographed volumes published fifty years ago, and which included scientific and philosophical as well as theological manuscripts, is shown in the following table:

	Pages of Reproductions	Pages of Original Manuscript
Photolithographed volumes.....	3,897	5,441
Phototyped volumes, under the editorship of Mr. Alfred Stroh.....	12,069	16,847

This showing of the immense amount of work done under the editorship of Mr. STROH brings strongly to mind the debt which the Church owes to Mr. STROH for his accurate and painstaking labors, not only in the superintendence of the work of reproducing the Swedenborg manuscripts, but also in the unearthing of many new documents and the discovery of many hitherto unknown facts respecting the life of Swedenborg.

Mr. STROH has been closely associated with the work of the SWEDENBORG SCIENTIFIC ASSOCIATION from its commencement some twenty-five years ago. Indeed, it was owing very largely to the efforts of the Association, supported by the generous aid of the GENERAL CONVENTION and the ACADEMY OF THE NEW CHURCH, that Mr. STROH paid his first visit to Sweden in 1902 for the purpose of superintending the copying of Swedenborg's manuscripts. He superintended this work with great accuracy for a number of years and as a result the Association now has in its archives several thousand pages of copies of Swedenborg's philosophical writings, which have never been published in any form. One of these, *DE SALE*, has already been printed by the Association in the original Latin, and another, *A PHILOSOPHER'S NOTE-BOOK*, is now being printed in the pages of the *NEW PHILOSOPHY* in English translation.

It is now well known in the Church that Mr. STROH has for some time past been suffering under very serious illness, and that there is little likelihood of his recovery. So far as human prudence can see, his work in the field of Swedenborgiana has now come to an end. His children can look back with pride to the amount and importance of that work and to the excellence and accuracy with which it has been done; and future students of Swedenborg will remember Mr. STROH's name with gratitude. We know that we express the feelings of all the mem-

bers of the SWEDENBORG SCIENTIFIC ASSOCIATION when we extend to Mrs. Stroh and her little children our profound sympathy with them in their present trying circumstances.

Since writing the above a cable was received from Mrs. Stroh announcing the death of her husband on March 9. The funeral was held at Upsala on the 14th, and the Rev. G. Baeckstrom, of Stockholm, officiated. Students of Upsala University acted as pall bearers and the student body sang in the church and at the grave. Mr. Stroh's death was noticed in all the Stockholm papers and laudatory comments were made of his life and work.

We can add nothing to what we have already written about Mr. Stroh's important contributions to the literary wealth of the New Church. The eighteen volumes of photolithographed manuscripts and the three volumes of the *Opera Cosmologia* will stand as an enduring monument to his memory.

Now that the work of phototyping Swedenborg's theological manuscripts gives promise of soon being entirely completed and disposed of, it is time to give some preliminary thought to the continuation of the work of phototyping by the reproduction of all Swedenborg's scientific and philosophical writings. Many of these have not been published in any form, and while several have been printed in their Latin text, yet in the one or two cases where comparison with the original MS. has been made errors have been discovered and also important omissions. But aside from this, the writings of Swedenborg are such that the student of the future should have an opportunity of access to the original manuscripts or to an exact reduplication of them. We are not dealing here with the case of an ordinary scientist, but of one who was prepared from his earliest years to receive the doctrines of the New Church in his understanding, and thus of one who was prepared by the formation of a rational philosophy. When preparation such as this is made for the revelation to the New Church, surely it is nothing less than the duty of the generation which has access to Swedenborg's original manuscripts to hand down to future generations the same opportunity for

exact study which they themselves possess. It matters not what we may individually think of the value of Swedenborg's earlier writings; future generations will form their own opinions; but it does devolve upon us to preserve for them the same materials for study that we ourselves enjoy.

Among Swedenborg's philosophical and scientific writings that yet remain to be reproduced are: *Opuscula Philosophica*, *A Philosopher's Note-book*, *The Brain*, *Generation*, *Senses*, *Anatomical*, *Cosmological* and *Mathematical Notes*, *Journal or Itinerary*, *Treatises on Silver*, *Sulphur*, *Salt*, *Vitriol* and the *Magnet*, and *Scientific and Political Papers*. The whole of this work would be comprised in about 6,500 phototyped pages, or about one half the number of pages which have been printed under the editorship of Mr. STROH.

We merely mention the matter at the present time, for it is quite evident that nothing can be done in the way of prosecuting the work of phototyping until the work commenced in 1910 has been brought to a definite conclusion by the final distribution of volumes to the respective subscribers; but we hope to revert to it at some future time. Meanwhile we would emphasize the fact that the work of reproduction is by no means completed.

THE GREEK RELIGION.

Among the phototyped volumes recently received by the Library of the ACADEMY OF THE NEW CHURCH, and which have been spoken of in the preceding notes, is a volume of the INDEX BIBLICUS containing, towards the end of the work, three pages of writing entitled RELIGIO GRAECA, which have never before been published in any form. It is this work that we present to our readers, in English translation, in the present issue of the NEW PHILOSOPHY. The volume in which it is contained was written towards the latter half of the year 1748, and this, therefore, must be ascribed as the date of the little piece now translated. Swedenborg was then 60 years of age, and his spiritual eyes had been opened for several years.

The writing is extremely difficult to read. Indeed, in two or three cases it has been impossible to decipher words.

The work itself seems to be an extract from some French author. That it is an extract is indicated by the words in n. 21, "hic auctor" (the present author), *i.e.*, the author from whom the quotation is made. That the quotation was made from a French work is indicated by the word "Salonique" for Salonica in n. 1; "George de Cappadocia" for Georgius Cappadociae (n. 7) and *Prestrise* for Sacerdotium—see n. 11 note. The last two paragraphs of the piece are evidently Swedenborg's comments on the extracts he has made, but from what work the extracts themselves were made is entirely unknown to us. Our readers may recall that Swedenborg made similar extracts respecting the Mohammedan religion which are published in his *PSYCHOLOGICAL TRANSACTIONS*. These were made from Gemelli Careri's *VOYAGE DU TOUR DU MONDE*. The extracts concerning the Greek Church, however, are not made from this work, as we have ascertained by examination, but they are probably made from some similar work. At any rate, they do not seem to have been based on any original study of the Creed of the Greek Church.

The extracts are of unusual interest inasmuch as there is very little in Swedenborg's published writings to indicate the extent of his knowledge respecting the Eastern Church. In the whole of these writings, with the exception of the present work, there are only three references to that Church: one in the *BRIEF EXPOSITION*, n. 18, where it is simply stated that he is not treating of the Greek Church, and two in *TRUE CHRISTIAN RELIGION*, Nos. 153 and 647. In the first of these numbers it is noted that it is "an error of the Greek Church that God the Father sends the Holy Spirit immediately"; and in the second it is said that "according to the Greek Church, God the Father gives to the Holy Spirit, Who is *per Se* a third God in order, all power of operating the effects of faith."

The closing comment in n. 22 to the effect that the Greek Church does not believe in justification by faith alone calls to mind the statements made in the Writings respecting the Russian nation, where, in Swedenborg's day as now, the Eastern

Church has the largest number of adherents. He speaks of the Russians as having no regard for religion (*Spiritual Diary* 5454), but this statement seems to apply more particularly to the upper classes. Of the common people, he says they are in great obscurity (*ib.*, 5452), but "are devoid of the love of self, and yet are thieves, and in order to acquire money dare and do all things" (n. 5949). Elsewhere he adds that "they are not so wicked as the rest in Christendom, being in great subordination and believing that all things they possess are not theirs but the Czar's. In the other life they retain this belief and live in this subordination; but with this difference, that all they have is not the Czar's but God's." He then continues that they are in obedience and are modest, the reason being because "they can be kept in good affection from the fact that they are in obedience and subordination and do not aspire to high things" (n. 5963). Elsewhere he states that "the Word is but little read in Russia but still it is believed to be holy" (*De Verbo* 16).

Taking all the statements together, it is clear that the Russian people are in that obscure state which is somewhere called Christian Gentilism. The state is indeed one of darkness, but it is far to be preferred to the state of faith alone, with its offspring materialism, that reigns in modern Christendom.

SOME NOTES ON THE ORIGIN OF MAN.

BY ALFRED ACTON.

Since the appearance of the last issue of the NEW PHILOSOPHY several comments and criticisms have been communicated to me respecting the article on The Origin of Man. I propose in the present notes to briefly review these comments.

Among minor criticisms, it has been suggested that the theory to which we give the name "Mother Nature Theory" would be better named "The Arboreal Theory." We have no objection to this name in itself, but to our mind it is more limited in its application than the name for which it is suggested as a substitute. The name "Arboreal Theory" describes the particular method by which man was first created. But the name "Mother

Nature Theory," while not so particularly describing the exact method of creation, seems more fully to express the philosophy that underlies the theory. Moreover, the one term applies only to the creation of man, whereas the other applies to the creation of the whole of the animal kingdom.

Criticism has been directed against us for what is alleged to be "scant courtesy" in our treatment of the hominine-animal theory. We did not, indeed, enter as fully into the examination of this theory as some of our readers would have desired, but we can assure those readers that this was from no intention of showing upholders of this theory any lack of courtesy; it was simply the expression of our own inability to see any consistent philosophy in the theory itself. Whatever may be said of its truth or falsity, the evolutionary theory, as ordinarily held in the world, is at any rate one consistent whole, the theory, namely, that higher forms were produced directly from lower forms by a development induced by various causes. This law of evolution is held as applying to the whole gamut of creation from the first plasma to the most highly civilized man. But to our mind the hominine-animal theory lacks the virtue of consistency. So far as we are aware, this theory has been broached and supported only by New Churchmen, who, doubtless, were desirous to reconcile the teachings of Swedenborg with the findings of biological science. As we understand it, the theory is that evolution proceeded from the plasma by gradual development, in some such way as held by the modern biologist, but that when it came to the creation of man a different law came into operation; and man was created, not by development from an animal, but by the immediate creation of human seed in the ovum or womb of an animal. This theory offers no reason why the law should have been changed when it came to the creation of man. Still less does it explain why a law should then obtain which is inconsistent with the law ruling in the preceding creation. And since the theory, therefore, does not enunciate any universal law, but simply assumes what seems to us to be a special law *ad hoc*, it did not seem to require any extended treatment. However, we did attempt to show the objections to the special phase that distinguishes this theory, namely, the immediate creation of

human seed in the ovum or womb of an animal; but we shall revert to this matter later on in the present article.

“IMMEDIATE CREATION” IN THE BEGINNING.

A critic has asked us how the statement in the Writings, that in the beginning all things were created immediately, is to be understood in connection with the doctrine presented in our article. The statement referred to is in TRUE CHRISTIAN RELIGION, n. 78. The Memorable Relation, given in this number, is an account of a conversation of an angel with Swedenborg on the subject of creation.

“I will show you (said the angel) how animals and vegetables of every kind are produced by God.” Swedenborg was then shown beautifully colored birds of every kind, herds of cattle and other animals, a garden in which were fruit trees of every kind, and many fields of grain. The angel then said, “All these things are correspondences of the affections of the loves of angels who are in the vicinity,” and he added that every least thing in the spiritual world was in like manner a correspondence. “These things have been shown you (he continued) that you may behold universal creation in a simple type. God is Love Itself and Wisdom Itself, and of His Love there are infinite affections and of His Wisdom infinite perceptions. The correspondences of these are all and each of the things that appear upon the earth. But in our world, which is called the spiritual world, there are like correspondences with those who receive affections and perceptions from God. The difference is that in our world such things are created by God in a moment according to the affections of the angels; in your world, *in the beginning they were created in like manner*, but it was provided that they should be perpetually renewed by generations of one from the other.”

The reason for this difference, he continued, is that the atmospheres and earths of the spiritual world are spiritual, while those of the natural world are natural, and “naturals were created to invest spirituals as skins invest the bodies of men and animals,” barks, trees, etc. Finally, after bidding Swedenborg tell these things to the inhabitants of earth, the angel con-

cluded: "Without a knowledge of this matter no one can know or even guess that creation is continuous in our world, and that it was *like this in your world* when the universe was created by God."

Without entering into the question of the *modus operandi* of creation in the spiritual world, it is evident from the above and other teachings in the Writings that in that world, as soon as an affection is active in an angel or an angelic society, there is at once presented the correspondential appearance of that affection; an appearance so real that it seems to be actually material; nor can any difference be discerned between these appearances and the fixed appearances of the ultimate world. These appearances may be forms of the animal kingdom or of the vegetable, but in either case it is full and complete appearances that are immediately created.

It is said that it was the same on this earth in the beginning, and the question that arises is, Does this statement mean that in the beginning animals and vegetables on the earth were created instantaneously in their full and complete form? We would answer at once, No! With regard to the vegetable kingdom, the Writings distinctly teach that "the first production from earths, when they were as yet new-made, was the production of seed. The first conatus in them could be nothing else" (*D. L. W.* 312). The same principle must apply to animal creation. For all things were born into order and according to order, and the order of this earth is that organic forms of life must progress from simples to compounds, and thus must grow from seed, and must gradually clothe itself with the grosser things of nature for its more ultimate embodiment. The law is a universal one and is necessary for the existence of the "as of itself" with man, and for the image of the "as of itself" in the animal and vegetable kingdoms.

It is the instantaneous creation of seed, then, that is meant by the statement that in the beginning vegetables and animals on this earth were created instantaneously as they are now created in the spiritual world. The matters and substances of earth which, by spiritual influx, were formed into the primitive seeds of earth had no life in themselves; there was nothing in them

that would develop into animal and vegetable forms. There must necessarily have been long preparation before they were fitted to receive spiritual influx, especially in the case of the higher and nobler organic forms; but as soon as this influx was received they were ordered and arranged into animal and vegetable forms at the very moment of the influx. This was, in fact, the instantaneous creation of fixed forms corresponding to affections, or the instantaneous fixing and infilling of spiritual influx. The taking on of grosser substances is merely a matter of time and growth and adds nothing to the essential creation. The essential creation of the fixed form is already accomplished when seed is made. And, indeed, the seed is actually the form of the vegetable or of the animal in the sphere and according to the geometry of interior nature. This is plainly manifest from the mere consideration that in the course of growth nothing whatever is added that will give form to organic beings. The form is already existent in the seed, and all that is added is but the further embodiment of that form, that it may descend into the grosser sphere of nature.

It may be objected that this "instantaneous creation" goes on at this day equally as in the beginning of creation. This, indeed, is essentially true, and necessarily so, since the law of creation is one. It is essentially true because the matters and substances from which seed is formed must first, in every case, have been received by the parent in the form of nourishment, and it is after they have been received and suitably prepared that the soul of the organic being forms them into living seed. But there is this difference between the primitive creation of seed and its formation in the course of generation, namely, that in the former case there is a sudden and *de novo* wedding, as it were, between the spiritual and the natural, whereas in the latter case the spiritual is already present in the blood or sap, and there gathers together and forms the matters and substances which are to perpetuate its existence on earth. In the one case there is the sudden creation and appearance of something new upon the earth; in the other there is the perpetuation of life already present and active in the sphere of nature.

THE HOMININE-ANIMAL THEORY.

A correspondent who thinks we have done scant justice to the hominine-animal theory, and who is himself strongly inclined to accept that theory, writes to us in a private letter: "I do not find the 'Mother Nature Theory' in the theological works of Swedenborg. Two great facts are recognized by you and by all New Church students of the subject: (1) The fact of the spontaneous generation of higher forms in lower forms as in a womb or matrix, so that higher forms come forth after and by means of the lower, even if not from them; and (2) the fact that the matrix must be in a state of fitness and adaptation to the embryo. If it is true, as you contend and I agree (he continues), that the seed of the vegetable world were generated in the soils as in the womb of a common mother, and the seed of the animal kingdom in the womb of vegetation, why would not the same reasoning call for a new and higher matrix for the reception of human seed?

"From a New Church standpoint, man is not an animal. Swedenborg never thus classifies him. Man is a kingdom in himself. The gap which separates man from animals is even greater than that which separates animals from soils. And if animal forms 'cannot rest on the bosom of the mineral kingdom,' how much less can human forms 'rest on the bosom' of the vegetable kingdom! Surely if there is anything in this line of reasoning at all, the womb of an anthropoid ape or similar creature seems by far the more fitting and responsive organism in which to mould the human form. Is not milk a better food for infants than fruit juices? Unless the primitive babe was entirely different from the modern, there is no evidence that he could live at all on fruit juices, much less thrive. And if as helpless then as now, by what means would he be brought to the source of his nourishment? While it is possible to imagine all sorts of conditions as existing in those prehistoric ages, yet all the known facts and observations of infant life are in favor of the animal mother rather than the vegetable mother, and to my mind the spiritual gap between all animals and man rules out entirely the thought that they can rest on the same 'bosom.'"

Our correspondent then suggests that we have "overlooked

the one great demonstration of the whole principle, namely, the conception and birth of the Lord's Human. The finite womb of Mary (he says) did receive the seed of the Divine Human. Could the animal creation have mothered the Lord? How, then, could the vegetable mother the rational man? The Divine Human was the last link in the chain which linked ultimates with firsts. The soils received the seed of vegetation; vegetation received the seed of animals; animals received the seed of rational man; rational man received the seed of the Divine Man." This idea, he continues, "seems to have everything in its support, rather than nothing." With the exception of the WORSHIP AND LOVE OF GOD, he "knows of no doctrine or fact that it contradicts, and it is eminently beautiful and consistent." And he concludes that the only alternative is "to regard the soils as the matrix of every form of life, including animals and man"; which theory, however, seems to him "to violate common sense; to be out of harmony with the great law of use by which one thing becomes necessary to another's existence and welfare; and to leave the incarnation as an anomaly."

Our correspondent has not, we think, given sufficient weight to the objection to the hominine-animal theory which we stated on pages 88-9 of our article. Quite apart from any courtesy or lack of courtesy in the treatment of that theory, we think the objection is a weighty one, and if not controverted must remain as an insuperable objection to the whole theory. An animal is an organic form of a particular affection. Into the ovum of an animal must therefore be gathered the whole quintessence of the substances and matters that are suited to form this one particular affection. Taking, then, the doctrine that influx is according to reception, it would necessarily follow that if man were born in the womb of an animal he would be born, as to his external, a form of one particular affection, an affection already formed for him by a preceding animal existence, and with ability, or at any rate an over-powering tendency, to develop that affection only. He would be born, not internally a man and externally an animal—for this, in fact, is what man actually is—but he would be born internally a man and externally one particular kind of an animal; one particular kind of affection

with the instinctive knowledge belonging to that affection. Yet the very essence of human life is that man shall be born without any affection and without any science, in order that he may be capable of receiving, developing and forming all kinds of affections; in other words, that he shall have the possibility of becoming any kind of an animal, savage as a tiger, mild as a dove. Therefore "man is not born into any love, nor into any science, in order that he may receive love and wisdom from God, but yet as if of himself" (*Conjugal Love* 136).

In a preceding paragraph we have already alluded to what we regard as the inconsistency of the hominine-animal theory in putting forth a different law of creation with respect to the creation of man than obtains in respect to the creation of the lower forms of the animal kingdom. But let us suppose this inconsistency to be removed, and that the theory contemplates that all animals were born in the same way as man, namely, by the immediate creation of seed in the womb of a lower animal. The general objection we have noted above with regard to man would still apply. For every animal is born one particular and distinct kind of affection, and this result could not be obtained if the body from inmosts to outmosts were the form of an already existing affection with all the science belonging thereto.

These objections are entirely removed if we consider that the whole of the animal kingdom was born in the womb of the vegetable kingdom; for the vegetable kingdom is not a kingdom of active affections with the definite sciences belonging thereto, but it is a kingdom of uses, whose inmost conatus and effort is to clothe all affections. This is evidenced at this day by the fact that the vegetable kingdom is the common nourisher of the whole of the animal kingdom from the lowest brute to man; thus nature is the nurse and mother, as it were, of all affections.

MAN AN ANIMAL.

But our correspondent feels that man is not an animal; that the Writings nowhere call him an animal; that there is as wide a gap between man and animal as there is between animals and soils. Consequently, while he accepts as true the theory that animals were born from wombs provided by the vegetable king-

dom, he contends that this could not be the case with man; and that the theory itself demands that for the creation of man a womb of higher form must be provided; and this, he thinks, was provided in some "anthropoid ape or similar creature."

We must take issue with the statement that man is not an animal. Man as to his natural mind and body is an animal; this is universally recognized. Man has all the appetites and desires of an animal; all the senses of an animal; the laws of his body are the same as the laws of the animal body. The fact that he has a rational mind does, indeed, distinguish him from all other animals, but nevertheless, as to his body and the lower mind, he is still an animal, though he is to be called a rational animal. It is the frequent teaching of the Writings that man as to his natural, or as to the sensual and corporeal man, is "merely an animal" (*True Christian Religion* 566); we read that he has all his natural affections in common with brute animals (*Arcana Celestia* 3020); that "he is altogether animal, not differing from a brute animal, except in being able to speak and reason" (*T. C. R.* 296); and that "he is distinguished from animals, not by his body, but by the fact that he has a spiritual mind" (*Doctrine of Life* 86). "There are only two universal forms produced out of the earth, namely, the animal kingdom and the vegetable," says Swedenborg in *DIVINE LOVE AND WISDOM*, n. 346; and in elaborating this teaching, he declares that "by animal forms are meant animals of every kind, and also men and angels" (*Divine Love* XXI). In other words, man being born natural, is born an animal; but he may become a man by virtue of having a human soul which implants in the body the faculties of rationality and liberty (*D. L. W.* 270). These faculties are, as it were, the seed placed in the womb of animal man, to the end that the rational man may be born. It is, indeed, of the very essence of man's nature that he shall be born in ignorance, in order that he may become rational; or that he shall be born merely with the faculty of rationality and liberty, in order that he may acquire as if from himself the actual gifts of rationality and liberty.

Now, if man, as to his sensual and corporeal nature, is an animal, there is no intrinsic reason why he should be created

differently from other animals; and this thought is confirmed by the fact that man is now born and nourished in exactly the same way as all mammalian animals, and according to exactly the same laws.

Yet in our correspondent's reasoning with respect to the ascent from animals to rational man, and from rational man to the Divine Human, we recognize a truth. But this truth is not at all weakened by the doctrine of the first origin of man from the vegetable kingdom; nay, it is rather strengthened thereby. The truth to which I refer is that from the mineral kingdom comes the vegetable; in the womb of the vegetable kingdom is created the animal, including man; and in the womb or cerebrum of the noblest animal or man is formed by the human soul the rational mind or man. It was this human mind that the Lord took upon Himself and glorified in Himself.

This doctrine of ascent, far from being strengthened, is, in fact, weakened by the supposition that the animal body of man was created from a member of the animal kingdom. The rational man can be born only in the most perfect manner. Life proceeding from God as the human soul can produce this most perfect animal man only from the collected riches of all the world. Such a perfect production would not be possible from the ovum of any particular animal, that is to say, from the ovum of any particular form of affection. It would be possible only from the wealth of the whole world, and by a medium to which each kingdom and all the least part of the kingdom could contribute their quota for the building up of the noblest work of animal creation. This gathering together of the riches of the world could be effected only in the most noble product of the vegetable kingdom, which can produce a form of use enriched and ennobled by the spheres of all organic forms, animal and vegetable, with which the atmospheres are enfilled.

THE TEACHING OF THE THEOLOGICAL WORKS.

Our correspondent affirms that the mother nature theory is not to be found in the theological works of Swedenborg. This, indeed, is true as regards the specific mention of the theory or its detailed application. The theological works give only the

general principles of creation; the particular manner in which those principles operate is not described.*

We are, however, told that in the beginning creation commenced with the production of seeds (*D. L. W.* 312); and it is plainly indicated that these seeds were produced by immediate influx from the spiritual world into the things of nature. In the spiritual world, we read, all things are created by God immediately, in correspondence with the affections and perceptions of the angels. In the natural world "they were created in like manner in the beginning, but it was provided that they should be perpetually renewed by generations of the one from the other" (*T. C. R.* 78). This doctrine that influx from the spiritual world first created seeds, and this at first immediately—and we think the doctrine must be applied to every individual species of the organic kingdoms—this doctrine neither affirms nor denies the mother nature theory. It is certainly in agreement with that theory as developed by Swedenborg in the *WORSHIP AND LOVE OF GOD*, as will be indicated. But it might be claimed as being also not opposed to the hominine-animal theory, provided that theory were extended to include the creation of all animals by means of seeds created in the ova of lower animal forms; though in this case we would still be at a loss to understand how the first animal forms were created. Aside from this, however, we have certain indications that Swedenborg never abandoned his doctrine as laid down in the *WORSHIP AND LOVE OF GOD*. We have certainly the negative evidence that he nowhere even remotely suggests the repudiation of this theory; and this nega-

* We may here note that the Writings very frequently lay down the general principles of a science, without going into detailed particulars. Witness, for instance, their teachings on the subject of the creation of the universe; of the formation of the heart and lungs; of the opening of the latter and their functions; of the offices of the cortical glands and animal spirit. And in all such cases that have come to our notice,

we have found not only that the necessary and illuminating details have been given in Swedenborg's earlier works, but that they are to be found in no other writings, except in one or two cases, in a very fragmentary way. This indeed is no more than is to be expected in view of Swedenborg's statement that he was prepared by the Lord to receive the doctrines of the New Church in his understanding. (*T. C. R.* 779.)

tive evidence is in itself of great weight, inasmuch as Swedenborg himself published the *WORSHIP AND LOVE OF GOD*, and must have been well aware that it would be regarded as in agreement with his later teaching, unless either specifically denied or repudiated by implication. And when, in view of this negative evidence, we note that all his theological teaching with respect to the mode of creation is in agreement with the *WORSHIP AND LOVE OF GOD*, it would require some very weighty reason to abandon the teaching of that work as inconsistent with the theological writings.

In addition to this, we have also some positive evidence, namely, the fact that in the *ADVERSARIA*, which was written after Swedenborg's spiritual eyes were opened, he distinctly and unqualifiedly affirms that his book on the *WORSHIP AND LOVE OF GOD* is in agreement with the Divine Word (*History of Creation*, n. 9).

THE FOOD OF THE FIRST BEGOTTEN.

Our correspondent further raises the question as to the food of the primitive infant, his question being that while it would be a simple matter to account for the feeding of the first man if he were born of an anthropoid ape or some similar animal, such would not be the case if man were born of the vegetable kingdom, seeing that "fruit juices" are not suitable for infant diet.

Here we note that while our correspondent admits that all other animals except man were born from the vegetable kingdom, he does not appear to see that the question as to food would apply equally to them as to man. Moreover, if we grant the descent of every species of animal from a preceding species, the question of diet would still come up in the case of the first of the mammals.

Of course, as our correspondent suggests, primitive man was very different in many respects from an infant as now born. According to the Writings, he was born into the order of his life and thus with instincts which would naturally lead him to the choice of suitable food. Moreover, we are not to suppose that nature acted blindly in relation to man's creation. The whole

series of creation is under the most particular auspices of the Divine Providence, and all nature concurred, not only to the birth of the first man, but also to his nourishment and protection.

Consider the many ways in which nature now provides food for the animal kingdom, especially in the temperate zone nearer to the equator where Swedenborg places his paradise. What, then, shall we say of the possibilities of nature's food in that perpetual spring which witnessed the birth of the first man! We speak merely of the fruits of the vegetable kingdom; but it must not be forgotten that animal milk also existed in the world long before the creation of man. When we, in our cold climate, think of "fruit juices," at once there comes to our mind the more or less acid fruits—apples, pears, peaches, berries, etc.—and instantly we think, surely these are unsuited for infant food! But in warmer and richer climates how different are the fruits of nature. Nay, she provides even milk; and in her woods she lays up stores of saps, as it were, which serve for rich and nutritious food—as in the case of the sugar cane, and other woods that provide nourishment for man by the mere sucking of them. Moreover, does our present knowledge of the edible fruits of nature exhaust all the fruits that nature actually now provides, to say nothing of the fruits that she may have provided in past ages and under different conditions? By no means impossible or even improbable is the existence of trees whose fruits were, as it were, paps hanging downwards and giving nourishment to the sucking mouth. And how poor is our standard of judgment as to the assimilative powers of the first begotten—born into the very order of their life—when we necessarily base that judgment on the infant of today, so prone to disease and death at the least exposure!

When we reflect on the varied and marvellous ways in which nature provides food for animals; when we consider how wonderful are the many devices by which animals procure their food, and after procuring assimilate it, can it be wonderful to us that nature would provide for the first born, even if such provision were made in ways not now familiar to us? The soul knows how to make use of such provision. It is the soul where the ends of life reside; and the soul, which has formed

all the parts of man's body, knows also how to direct its movements for its sustenance and the building up of the mind. We have a remarkable illustration of this in the use of the umbilical cord, as given by Swedenborg in his work on *GENERATION*. He there explains that the reason why the cord is wrapped around the neck of the infant is in order that the soul by the motion of its head and neck may augment or decrease the supply of maternal blood according to need. If the soul does this and infinitely more marvellous things for the formation of its body, will it not do like marvellous things and instil like marvellous instincts when the body is born? And if we, in human providence, provide all the means necessary to the securing of our ends, how much more would Divine Providence provide the means exactly adapted to the end of creation. Divine Providence does, indeed, act according to laws, but the laws of Providence are not blind laws; they are laws which directly look to the securing of the Divine end. We may suppose, therefore, not only that the first-born man was born into the order of his life, and thus with instincts such as animals now have, but also that wise provision was made for his nourishment. This is the teaching of Swedenborg in his *WORSHIP AND LOVE OF GOD*. There, after speaking of brute animals, at birth, and showing how at this day man is born comparatively imperfect, he continues:

"It was altogether otherwise in our first begotten, whose intellectual mind was not to be instructed and perfected from the senses but from the soul itself, while the sensories were only subservient. For he was born into a state of the greatest integrity; * wherefore full power must have been given to his soul from the first moment of life, enabling it to operate upon the muscles and sensories of the body without the mediation of the secondary mind or will. That the case is otherwise now is a most evident sign of imperfection" (*W. L. G.* 43, note).

The same teaching is found in the theological works, as, for instance, in the *ARCANA CELESTIA*, where we read:

* It may be asked how this teaching squares with the theological teaching that the preadamites were born in gross ignorance. The answer is that the integrity here spoken of, is the integrity of the

body and of the instincts of the natural mind, or the integrity resulting from the complete rule of the soul without the opposition of depraved appetites.

"If man were not imbued with hereditary evil the rational would be born immediately from the marriage of the celestial things of his internal man with its spiritual things; and by the rational, would be born the scientific. Thus man would have all the rational and all the scientific as soon as he came into the world, for this would be according to the order of influx. This may be concluded from the fact that all animals are born into all the scientific that is necessary and profitable for them in respect to their food, protection, habitation and procreation; for their nature is according to order. What then would not be the case with men, if order had not been destroyed with him! for he alone is born into no science" (*A. C.* 1902).

As to the nourishment of the first begotten, Swedenborg says:

"When all things were prepared and the moment came for the birth of the infant, the parturient branch, inclining itself gradually toward the ground, at last deposited its burden on the couch underneath. And when the months were completed, the infant, perfectly conscious of what was decreed, himself broke through the bands and barriers of his enclosure, and raised himself by his own exertions into this world and its paradise, to immediately draw in with his nostrils and lungs the air, which he saluted with a light kiss and which pressed in by its force, as a new vital guest and spirit,—the guest and spirit which is meant by the words 'God breathed into his nostrils the breath of life.' The choicest flowers encompassing this bedchamber now exhaled their odors; that thereby, they might penetrate and exhilarate all the blood of the infant, flowing from the heart and now meeting the air, with rich and delicious gifts. Whatsoever was in the kingdoms of nature, excited by a kind of festivity, favored and greeted this birth.

"He was naked, but encompassed with the mildest spring as with a bath. The soul incited its little body, like a sort of active force, directing its powers to all things which were to be done; and she taught it the manner in which to incline itself to the paps, several of which were extended forth by the maternal branch; to press them with its fingers; to suck the milk with its mouth; to roll it about with the tongue and palate, to lie down after taking a proper quantity; and several other operations which were inspired into this infant, born without a nurse into the essential order of life and nature. Thus he lived wholly and entirely as a soul under the image of an infant clothed with a body. Wherefore, in the first twinkling of his sight, the little infant crept from his couch and with his fingers laid hold of whatever came in his way,—but only on such things as were suitable; and he brought them to his little lips, and then again betook himself to his couch by creeping. The ruling mind sometimes also laid him on his back, where drops of milk fell straight into his little mouth. Wheresoever fragrant flowers grew, thither he stretched his hands, and moved these flowers to his nostrils, that he might excite his organ of smell. In like manner he pricked up his ears to the singing

of birds; nor was anything grateful to the use of his senses, which was not conducive to the uses of his body. Although the soul transcribed herself into the form of a body, the type of herself, yet residing in her supreme and inmost principles, she was always endeavoring to elevate that type to herself, and so continually inspiring all the fibres of the tender body drawn downwards by the accessory powers of inertia, to take a direction upwards. For the infant as yet crept, and differed nothing from the wild beasts in his manner of moving; which, being observed by the soul, she used all her endeavors to elevate him on high and to set him erect on his feet. She bended his eyes to most beautiful fruits hanging from branches aloft; and she incited a desire that he should lay hold of them with his fingers, adding also strength to his muscles; and thus allured him to raise his countenance upwards from the ground." (*Ibid.*, Nos. 38-44.)

Again we have the same teaching in the theological works, though with less detail. In the DIVINE PROVIDENCE we read:

"If man were born into the love into which he was created, he would not be in any evil, nay, he would not know what evil is. He would not be born into the darkness of ignorance as he is now born, but into a kind of light of science and hence of intelligence, and into these he would shortly come. Indeed he would first creep like four footed animals, but with an implanted conatus of erecting himself upon his feet; for though a quadruped, still he would not cast his face downwards to the earth, but forwards to heaven, and would erect himself that he might look upwards also" (*D. P.* 275).

The language of the WORSHIP AND LOVE OF GOD is the language of poetry, but it is the poetry of exact truth, a mirror in which we see reflected the Divine Love and Wisdom, acting not as blind force, but as the power of God-Man, for the feeding of the first-born and the beginning of the establishment of an angelic race from men.

THE TERM EVOLUTION.

A friendly critic has questioned whether we have been quite fair in our treatment of the doctrine of evolution. To his mind our paper will be taken by most readers as a condemnation of evolution *in toto*, whereas, in his opinion, a close reading will show that the paper itself upholds the doctrine, in the sense that it upholds the existence of a concatenated and connected series of causes and effects from protoplasm to man.

The whole question here turns upon the meaning of the word

evolution. If by that word is meant merely that there is a connected chain from the first thing of creation to man, and that each posterior link of this chain depends upon the preceding link, then, of course, every New Churchman must accept the term evolution as expressive of the universal truth of creation. But in this cause it would be necessary to clearly define the sense in which the word is used. The sense in which we have just defined it is not, we contend, the meaning of the word either etymological or as used by the learned or by the generality of men. The latter, by evolution, are very apt to understand what is called the Darwinian Theory of Descent, namely, that a higher species was descended directly from a lower one by external and accidental modifications, and that man was descended from an ape. The learned usage of the term does not essentially differ from this; but the learned are becoming more and more doubtful and even sceptical of every explanation that has been so often offered as to the causes and modes of the descent. To both the learned and the unlearned the essential meaning of the term is that in some way or other, known or unknown, a higher species was developed directly from a lower species by the operation either of extraneous natural causes or of causes inherent in the lower species themselves, or of both causes together. This is in agreement with the definition of evolution as given by WEBSTER, who explains it as meaning

"The development, not of an individual organism but of a race, species, or other group; in general, the history of the steps by which any living organism or group of organs has acquired the morphological and physiological characters which distinguish it; hence the theory that the various types of animals and plants have developed by descent with modification from other pre-existing types, as opposed to the old theory of the separate creation of each species. This theory involves also the descent of man from the lower animals. Modern theories of evolution differ only in regard to the various factors influencing it, their relative importance, and the ways in which they act."

In the biological world investigation has more and more tended to the rejection of all the theories by which the process of evolution has hitherto been explained. "It is impossible (said Professor WILLIAM BATESON, in an address delivered last December before the American Association for the Advancement

of Science), it is impossible for scientists any longer to agree with Charles Darwin's theory of the origin of species." And, in the preceding September, Dr. D. H. SCOTT, in an address before the British Association for the Advancement of Science, remarked that "the Darwinian period is passed; all again is in the melting pot." In these words is voiced the fact—which is becoming more generally known—that, under critical examination, every theory by which the doctrine of evolution has hitherto been explained has been found wanting. Yet, in common with almost all biologists, the speakers whom we have just cited insist (to quote the language of Dr. SCOTT) that nevertheless "evolution remains, for there is no alternative, and the evidence of palaeontology is unshaken." In other words, as an editorial writer in the *LONDON TIMES* observed in commenting on Dr. Scott's address, "the mode by which existing plants and animals have arisen is descent with modifications from one or more simple primitive forms. That was the theory which Darwin set out to prove in opposition to current doctrines. He did succeed in convincing the thinking world of its truth, and the subsequent progress of knowledge has widened the basis of that conviction until there is no part of the order of nature on which there is higher certainty."

Now it is evolution as thus defined—and etymologically the definition is a just one—that we had in mind when condemning the doctrine of evolution. The doctrine condemned is essentially that all the future development of the universe is locked up in the protoplasm, and must be drawn out or evolved therefrom in order to come forth to view. That this is clearly involved is manifest from the history of the doctrine as developed by biologists. Darwin and Lamarck sought to account for variation and change of species by external influences, either direct, such as protective coloring, sharper sense, environment and so forth, or indirect, such as hereditary transmission. Investigation has overwhelmingly shown, however, that purely external causes do not suffice to account for the development of new organic forms of life. Of the many other causes for evolutionary variation that have since been put forward, there are two that seem to have had most weight, and these are directly

based on the assumption that all the possibilities of life are enclosed in the protoplasm, and have but to be unfolded or evolved, like the unwinding of a spring, for creation to stand forth in its present perfection. We refer to De Vries' theory of sudden spurts or leaps arising from some innate tendency, the source of which is not yet known; and to Weismann's theory, that there are innumerable undeveloped germs within every organic form of life, and that evolution is simply the manifestation and development of some one of these germs; according to the neo-Darwinists, one of the germs being developed and not another, because it is placed in a more fortunate position; or because it prevails in the "struggle for existence" from some other reasons; or even from some inherent cause. In theories such as these the term evolution is used in its true etymological sense as meaning the evolving or drawing forth of that which is latent within.

These two phases of the evolutionary theory—the one seeking the causes of evolution in external modifications, and the other seeking those causes in latent forces residing within organic forms, and the evolution of which bring out new species—these two phases of the theory are both included in a statement in DIVINE LOVE AND WISDOM, where Swedenborg declares:

He who does not know that there is a spiritual world, and that it is distinct from the natural world, like the prior and the posterior, cannot know anything about the influx of the spiritual world into the natural. This is the reason why those who have written about the origin of vegetables and animals could not do other than deduce that origin from nature; *and if they deduce it from God*, they can do no other than think that God has from the beginning implanted in nature the force of producing these things; not knowing that there is no force implanted in nature; for nature is in itself dead and contributes no more to the production of these things than an instrument contributes to the work of a mechanic, which, if it is to do anything, must be continually moved. It is the spiritual, drawing its origin from the sun where the Lord is, and proceeding to the ultimates of nature, which produces the forms of vegetables and animals, and presents the marvels that exist in both kingdoms, closely surrounding them with matters from the earth that these forms may be fixed and constant (*D. L. W.* 340).

If by evolution is meant simply that there is a concatenated series in the progress and development of creation, then, as we

have said, the term cannot be objected to; but, then, the word needs some special explanation. For evolution properly means the evolving or calling out of something latent within; and, as we have noted, accumulated investigations have led the latter-day defenders of the theory to the root meaning of the word, and they have assumed that all development from a lower form of life is actually a consequence of causes (germs) enclosed within lower forms. This, we hold, is contrary to the doctrine as put forth by Swedenborg, both in his theological works and in his scientific.

Now, if the term evolution is used in any other than its true etymological sense; if, for instance, it is used to describe the theory that every organic form serves to invest or clothe a higher use flowing in from God the Creator, then, as we have already said, this alien meaning should be specifically set forth. To our mind, however, it is clear that evolution is not a suitable word for the defining any such theory. More suitable would be the word Investiture, Investment, or some other word involving the same idea. Some such word is, moreover, indicated in those numerous passages where the doctrine is given that "Nature was created solely that it may invest the spiritual" (*Heaven and Hell* 102), "as the skin invests the body, the bark the tree, the meninges the brains, the tunics the nerves, and so forth" (*T. C. R.* 78).

Yet there is a true use of the term evolution in the work of creation; but this use of the word has in view the whole universe as one Grand Man, of which Divine Love and Wisdom is the soul. This Grand Man is, as it were, enswathed with matters, and it is as these matters are unswathed or rolled away, so the uses flowing from God Man come to view. It is thus that creation has ascended step by step from mere matter to the angelic heavens. One after another of the coverings of life have been laid aside or died, as it were, in order that the universal uses of life may stand forth. We see an image of the same process in the growth and regeneration of man. From natural he must become spiritual, and the ascent is made just so far as the natural is put aside or dies that the spiritual may be born—even as our body must die that the spirit may live. We say "die," but

the word is not used in an exact literal sense. Indeed, the body itself never entirely dies; for always man retains the finest things of nature as an ultimate and cutaneous receptacle of life. But in the ascent of creation a thing may be said to die and to rise again when it comes into the use for which it was created. The pleasures of the flesh die, as it were, when they cease to dominate man and become the servants by which the spiritual mind is opened. Sciences likewise die when they cease to become the dominating things in the mind and enter into their use which is to clothe and confirm spiritual truths. In all these cases the higher does not evolve from the lower, but the lower serves as the womb for the birth of the higher. There is no evolution in the sense of the higher being evolved from the lower; but there is an evolution in the sense that, in the microcosm as in the macrocosm, the soul gradually unswathes itself or rolls away its coverings that itself may be revealed.

The doctrine for which we would contend is that all influx is one and unchangeable. The First Proceeding from God-Man contains within itself all things of the created universe. From this First Proceeding are created posterior atmospheres, one after the other, until their activity ceases in "substances and matters at rest" (*D. L. W.* 302). These substances and matters do not contain within themselves either the vegetable, the animal or the human soul. They are the ultimate forms of creation, whose purpose, and whose sole purpose, is to clothe the living uses which proceed as atmospheres from God-Man. And because this is the origin and end of their creation, therefore they have an inmost conatus to clothe uses.

This conatus is manifested in the internal activities of the things of the mineral kingdom, and consequently in the spheres which they constantly give off. When, by the interaction of the members of the mineral kingdom and by their spheres of active substances, new forms or new combinations are produced, they at once serve as vessels for the reception of the uses that flow as atmospheres from God-Man. The uses themselves exist, not latently in the mineral kingdom, but in the atmospheres which are prior to and above the mineral kingdom; but it is only as suitable vessels or suitable forms were provided that these uses

could be clothed as vegetable seed; and according to the variety of the forms thus produced by the mineral kingdom, such was the variety of the seeds of the vegetable kingdom that were thence created. In the Lord, and consequently in the Divine Proceeding as atmosphere, exist all uses; but they are born upon the earth and thus come to view as actual uses, only so far as suitable vessels are present for their reception. This is the law by which evil uses became present on the earth as evil forms of the vegetable and animal kingdoms. There is nothing latently concealed in the foul or rotting substances of nature which will of itself give rise to evil plants or evil vegetables. For, necessarily, rotting substances existed before the creation of man, and still more before the fall. But they produced no evil forms of life until active spheres of evil lusts were generated by man. It is these spheres, and not the putrid and foul substances of nature, that furnish the origin to evil organic forms; though they could not actually produce such forms unless there were present in nature corresponding substances capable of receiving and inmosty investing them.

The mineral kingdom, therefore, has no intrinsic power or property of producing the forms of the vegetable kingdom; but in the things of the mineral kingdom resides an intrinsic conatus to clothe the uses of the vegetable kingdom, to provide forms receptive of the vegetable soul. The evidence of this conatus is seen in the outlines of vegetable forms that are daily produced in the mineral kingdom, as, for instance, in the frost on the glass and so forth; where we also see that this conatus alone can produce only lifeless forms, forms which will ever remain lifeless until vivified by the influx of the vegetable soul.

A manifest sign of the same law is also evidenced in the vegetable kingdom, in which there is an inmost conatus to serve for the clothing of the animal kingdom. It is this conatus that inspires them to put forth flowers which by their forms and colors, emulative of the forms and colors of the great universe, may gladden the eyes of man, and by their sweet odors may fill his bosom with delight. It is this that leads them to produce their fruits and to adorn them with beautiful vestments, and set forth their attractions by exhilarating odors, that so they may

induce man, as it were, to partake of their bounty, and may thus fulfil their hidden conatus to use. From and by means of the vegetable kingdom new and more complex forms can be produced, which are suitable for clothing those higher uses from God-Man, which when so clothed produce the seeds of the animal kingdom. And so from the contribution of all the riches of all the kingdoms of nature can be produced that most wonderful form into which can flow the human soul. It is not that the human soul was then created; for life from God-Man, which is the soul of man—this life with its end of creating the human race and thus the angelic heaven—exists in the first proceeding of creation, and this proceeding is everywhere incumbent upon the earth; but it can manifest itself, it can present itself to view as human seed and finally as a human soul in a human body, only when the choicest materials, the “finest things of nature” are at hand to serve its purpose and be bent to its will.

This order of creation is expressed in the law that things first flow into things last, and there, and there only, produce intermediates, which are the actual existence of the ends that reside in firsts, and intermediates are produced not *from* ultimates, but from firsts by means of ultimates as receptive vessels. The law is seen in the creation of the macrocosm. Here the Divine proceeds by means of atmospheres to the very ultimates of matter, that in these ultimates its uses may be clothed and thus formed in actuality (*D. L. W.* 302 *seq.*). It is also imaged forth as in a type in the microcosm, both in its leasts and in its greatest. In its leasts it is seen in the fact that the soul, at every step in its formation of the body, first forms ultimates and then intermediates. Thus, according to Swedenborg, the first thing in the formation of a muscle is the laying down of a cutaneous envelope or web; within this the muscle itself is then formed or created by the soul (*Periosteum*, n. 5). And in *DIVINE LOVE AND WISDOM*, speaking of the primitive formation of man, Swedenborg says that even at the very first there appeared “a delicate delineation of something like a face in front” (*D. L. W.*, n. 432). The same law is seen in man as a whole, in the formation of his mind. The soul flows no more fully into the body in the case of an old and wise man than it did in the same

man when he was an infant; but as, by means of the senses and education, the man takes in new knowledges, new forms, new habits, so the interior substances of the mind become newly formed and fashioned, and the incumbent soul, ever in the effort to create, to give itself, will vivify these forms, and thus create the world of spiritual objects, which are loves, affections, thoughts and perceptions. The knowledges that come by way of the senses have nothing intrinsic in themselves for the production of these spiritual creations; these spiritual creations were not evolved from them—the spiritual from the natural; but they do have, as it were, a *conatus* for clothing higher, or spiritual and formative uses. It is thus by means of what we call “investiture” or investing, rather than by evolution, that man is developed from being an animal to being a truly rational man and angelic mind; and it is by the same means that the primitive forms of the organic kingdoms of nature, both vegetable and animal, came into existence and now perpetually exist.

If one cares to call this theory evolution, well and good; but he must be careful to define this unusual use of the term, a use not justified by its etymology, and certainly not in common vogue. We do not doubt that among the learned of the world there are some who believe in the Divine Love and Wisdom of God the Creator, and who, in searching for the proof of the doctrine of evolution, do not eliminate this factor; who believe that in some way or other all the development of creation is due not simply to an evolution from nature, but to the power of the Divine. Such thought, however, has no appreciable influence on the modern scientific world; no influence which is in any way commanding in the university centers of learning. And in any case, without a knowledge of the spiritual world and its relation to the natural, the thought of such Christian philosophers (as indicated in a passage we have already quoted) will find its expression rather in a belief that life and its possibilities of development was Divinely implanted in nature from the beginning, than in any doctrine that influx from the spiritual world is the direct cause of the creation of organic forms, and of their perpetual existence.

It is the theory of “investiture,” if we may so call it, that

Swedenborg describes in his WORSHIP AND LOVE OF GOD, in treating of the formation of the seed of the first man:

"In a paradisiacal grove (he says) was a fruit tree, which bore a small egg, the most precious of all others, in which, as in a jewel, nature concealed herself with her highest powers and stores, to become the initiations of the most consummate body; this fruit tree was hence called the Tree of Life. But this little egg was not as yet fecundated, although nature had collected into it, as into a sacred ark, her most distinguished treasures and valuables, and had provided it with noble furniture such as a bride prepares for her bedchamber when she expects the coming of the bridegroom. When nature had thus completed her work and collected her circumferences, as it were, into this egg as into a center, then the Supreme Mind came to meet her, and with concentrated rays, from Itself as the very Sun of Life, conceived the supra-celestial form or soul, which was life, and was capable of containing what is infinite by means of the Infinite Itself. This form or soul the Supreme Mind infused into this treasure or little egg. As soon as she was first breathed into her little egg, the soul instantly began with pure ideas to look to ends, and to represent to herself the universe,—not only the universe of nature, as the souls of brutes do, but also the universe of heaven, with its loves and intelligences. She began, therefore, from a kind of sacred fire, to inwardly desire that she might be conveyed from the highest citadel in which she was, to the lowest things of the world, or to the birthplace of her egg; and therefore she looked about for means and instruments by which she might enjoy her wishes. And lo! nature, with her aids enclosed in the same little egg, was at hand and made a tender of herself and her powers, to be called forth at the least intimation of her purpose, and to afford every assistance that might be desired" (*W. L. G.*, n. 32-34).

THE GREEK RELIGION.¹

[*Note.* The paragraphs to which we have added numbers, represent the paragraphs of the original MS. The unnumbered paragraphs are not separate paragraphs in the MS., but are separated from the preceding words by a line. An asterisk indicates a word of which we are in doubt, or which we are unable to decipher.

For particulars as to these notes on the Greek Religion, see the preceding Notes by the Editor.]

[1] There are four PATRIARCHATES: 1. The most ancient is that of Alexandria, with jurisdiction over Egypt, Arabia, Ethiopia and India. 2. The Patriarchate of Jerusalem, over Palestine. 3. The Patriarchate of Antioch, over Silicia, Mesopotamia, Syria and Phoenicia. 4. The Patriarchate of Constantinople, which is called the oecumenical or universal patriarchate,² over Europe, Istrea, Greece, Bithynia, Cappadocia and Mysnia.

[2] There were, or are, thirteen Archbishops:³ 1. The Archbishop of Heraclia, under whom are five episcopacies. 2. The Archbishop of Salonica, under whom are eight episcopacies. 3. The Archbishop of Athens, under whom are four bishops. 4. The Archbishop of Lacedemonia, under whom are three bishops. 5. The Archbishop of Larissa, under whom are six bishops. 6. The Archbishop of Adrianople, under whom is one bishop. 7. The Archbishop of Tornobar,⁴ under whom are three bishops. 8. The Archbishop of Johanna, under whom are four bishops.

¹ That is, the Religion of the Greek or Eastern Church.

² The Church in Russia withdrew from subordination to the Patriarchate of Constantinople in 1721, when Peter the Great proclaimed the Patriarchate of Moscow as "the Most Holy governing Synod" with the Czar at its head. This was sanctioned in 1723 by the Eastern Patriarchs, who looked upon the Czar as the future deliverer of the Church from the Turkish yoke. Thus, the four

Patriarchates were increased to five.

At the proclamation of the independence of Greece in 1833, the Church there also withdrew from the jurisdiction of Constantinople. The Church in Bulgaria, Servia and Roumania are now likewise independent of the oecumenical patriarch.

³ Also called Metropolitans.

⁴ Probably Tirnova, a Metropolitan See in Bulgaria.

9. The Archbishop of Monembasia, under whom are four bishops. 10. The Archbishop of Phanaicon,* under whom is only one and near the reins. The priest anoints the ears in order that three bishops. 13. The Archbishop of Proconesus, under whom are two bishops. In addition to these there are also a number of episcopacies.

The Patriarch of Constantinople is chosen by the bishops and confirmed by the Emperor⁵ in Constantinople. Great expenditures are entailed when the office is obtained and entered into.⁶

[3] The income of the priests was formerly obtained from charity, but since charity has grown cold they now receive their revenue from absolution, confession, baptism, marriage, excommunication and communion of the sick.

In early times the Bishop of Rome and the Bishop of Constantinople were equals, but later the dignity was given to the Bishop of Rome. The Greeks do not acknowledge the Roman Church as the only Catholic Church.

[4] The Greek Church admits no other than Jesus Christ as the Head of the Church, under whom the Patriarchs, Arch-

⁵ That is, by the Emperor before the accession of the Turks; since then the prerogative of confirmation belongs to the Sultan. The Emperor, and after him the Sultan, also had some share in the nomination of candidates.

⁶ Before the election a license to proceed is obtained from the Grand Vizier, and some ceremony is observed in giving this license. After the election, the Grand Vizier presents the patriarch with a white horse and richly embroidered garments. A magnificent procession is then formed, including Turkish officials and great crowds of people. Arrived at the church door, the patriarch is received by the Bishop of Heraclea, as chief archbishop, who conducts him to

the throne and there invests him. Needless to say, the election gives many opportunities for exactions by Turkish officials, including the Sultan himself who not only has the sole power of confirming the election, but who can also depose and even execute the patriarch after his election. During the last century the Sultan exacted 25,000 crowns and even more for confirming an election. It was this exaction that led Cyril Lucar (spoken of in a later note) to refuse election in 1613, when he was supported by the Ambassadors of England, Holland and Sweden. He accepted, however, in 1621, when unanimously elected by the Synod.

bishops and Bishops exercise their authority. They found their authority on Matthew 18: 17.⁷

[5] They believe the interpretations of the Word as made by Councils or Synods, and thus by the Patriarchs and Bishops.⁸

[6] Their Articles are:⁹ 1. The necessity of being at church on sacred days and fast days. 2. They must observe fasts, even the extraordinary fasts. 3. Obedience to the priests. 4. They must confess their sins four times a year. 4 [a]. The laity must not read heretical books.¹ 5. Prayers for kings and princes, patriarchs, etc.² 6. The privileges of the clergy must not be violated, etc.³ 7. They must not contract marriages during periods of fasting, nor must they then go to the theater.

[7] Their FASTS are four in number: 1. From the 15th November to the 25th December, lasting forty days.⁴ 2. The second comes before Easter.⁵ 3. The third begins on the week after Pentecost and is called the Fast of the Apostles.⁶ 4. The fourth begins on the 1st August and ends on the 15th August;

⁷ "And if he shall neglect to hear them, tell it unto the church; but if he neglect to hear the church, let him be unto thee as a heathen man and a publican."

⁸ The Greek Church places infallibility solely in the seven Oecumenical Councils and in the Patriarchal Oligarchy as a whole,—but not in any individual patriarch (Schaff, 1 *Creeds* 922).

⁹ The eight points that follow are brief summaries of the "Precepts" of the Church, as laid down in questions 87-94 of the ORTHODOX CONFESSION OF THE EASTERN CHURCH; see Schaff, 2 *Creeds* 364 seq. There are nine of these "precepts," the seventh, to the effect that the special fasts and prayers ordained by metropolitans or bishops for their districts shall be faithfully observed, has been omitted in the summary.

¹ The reading of the Word, how-

ever, is not forbidden. In modern Russia it has indeed been encouraged.

² All services in the Russian Church included prayers for the Czar and royal family and for the archbishop of the diocese.

³ That is, that they shall not be deprived of the goods and the moneys of the church, of which they are the guardians; and the guardians themselves shall not devote pious gifts to their own private use.

⁴ The Fast of the Advent.

⁵ The Great Fast, or Great Quadragesima. It is commemorative of the forty days of the temptation in the wilderness.

⁶ This fast ends June 29th. It receives its name from the circumstance that before the Apostles went forth to preach the Gospel they celebrated a fast (Acts xiii, 3).

then is celebrated the assumption of the Virgin Mary, whom they believe to have been bodily raised to heaven. It is celebrated with holiness. There are particular fasts, but these are not so uniformly celebrated. They must abstain from flesh, sugar,⁷ ———, * ———. * They are not given dispensations from fasts by the patriarchs, as is done in the Roman Catholic Church, except in cases of sick persons when there is the highest necessity.

[8] **FEAST DAYS.** They begin the year on the 1st of September;⁸ then comes the Feast of Gladness. 2. Easter. 3. The Feast of John, 2d September.⁹ They acknowledge saints in addition to the Apostles; also the more celebrated fathers, such as Basil and Chrysostom. Besides these they have three special saints, Cosmas, Damian and George of Cappadocia.¹

There are feast days for Mary; for the exaltation of the cross;² for the Apostles; and for the three above-named saints; for certain of the fathers; and for a few others. They sanctify still other men celebrated for their miracles and the holiness of their life. This matter is decided in the Synod.

[9] They have seven MYSTERIES or SACRAMENTS: 1. Baptism. 2. Fasts.³ 3. The Holy Eucharist. 4. The Priesthood. 5. Matrimony. 6. Repentance. 7. The Oil of Prayers.

⁷ Sugar was included because it was purified with bullock's blood; honey, raisins, etc., were used as substitutes.

⁸ September 1st is the beginning of the ecclesiastical year in the whole Eastern Church. In the Byzantine Empire it is also the beginning of the Calendar year, but this has been abandoned in modern Russia.

⁹ The festival held in commemoration of the conception of John the Baptist is held on September 24th. This perhaps is the feast referred to in the text.

¹ Cosmas and Damian were two Christian physicians from Arabia, who lived in Cilicia where they gave their services free. During

the Diocletian persecution they were tortured for their faith, and finally were put to death. They are now acknowledged as the patron saints of physicians and apothecaries. Their saints day is September 27th.

George of Cappadocia is the same as the St. George who is adopted as the patron saint of England.

² September 14th. This is a fast day in commemoration of the Passion.

³ This is probably an error for Confirmation (see below n. 7); for fasts are not regarded as sacraments. The seven "mysteries" as given in the ORTHODOX CONFESSION OF THE EASTERN CHURCH are Bap-

[10] BAPTISM. The infant is carried to the entrance of the church and the priest makes a sign of the cross over its forehead, lips and stomach;⁴ this is called the seal of baptism. 1. They pray that the child may renounce the vanities of the world, may escape the snares of the enemy, and may follow the precepts; that so he may be united to the Church, if this is pleasing to God.⁵ They immerse the infant in water. It is believed by them that baptism takes away original sin and purifies therefrom. The priest baptizes into the name of the Father, of the Son, and of the Holy Spirit. It is said that there is a trine immersion in the water, once for each of the Persons.⁶ 2. Chrysostom holds that the virtue and efficacy of baptism is the sign of the resurrection and immortality of the Christian man; wherefore on the first immersion the priest says, "Let the old man be buried"; on the second, "Let him be reborn and become

tism, Anointing or Confirmation, the Eucharist, Repentance, the Priesthood, Marriage, the Consecrated Oil. These are said to correspond to the seven gifts of the Holy Ghost (Schaff, 2 *Creeds* 374).

⁴ In the modern church the sign is made over the forehead, lips and breast.

⁵ This prayer is made prior to the baptism, and in the presence of the parents. The latter then leave the child in the care of the god-parents, the priest puts on his full canonicals, and the baptism is administered. The requirement that the parents shall not be present during the ceremony is strictly observed. Its origin probably dates from the early days of Christianity when the parents were generally heathen (Romanoff, *Rites and Customs of the Graeco-Russian Church*, p. 70).

⁶ Concerning this trine immersion, an English lady married to a Russian and long resident in Rus-

sia writes: "It is at the mention of the three names that each immersion takes place. The priest stops the infant's ears with his thumb and little finger, its eyes with the fourth and fore fingers of the right hand, and with his palm he covers its mouth and nostrils; with his left hand he holds its body, and plunges it face downwards. It is not every priest who has the knack of performing this difficult task well. I have heard that little innocents have been known (though this a rare occurrence) to be drowned at the very moment they were made Christians; I should suppose, however, that they must have been very weakly, perhaps in a dying state, as a priest would hardly undertake the task unless he felt himself competent." (Romanoff, *Rites and Customs*, etc., p. 72.) It may be added that the Russians regard sprinkling as equally efficacious as immersion; and this is more or less true of the whole Eastern Church.

a new creature"; on the third, "Let him be elevated to the perfection of eternal life." It is done three times for the purpose of going against heretics who denied the Trinity. Before the sacrament, the priest breathes upon the infant three times to put the devil to flight. After the Sacrament he anoints him in oil with the sign of the Cross, in order to signify the reconciliation of man by God, and regeneration by the Holy Spirit.⁷ A solemn prayer is then read, treating of Noah and the flood, and of the olive leaf carried by the dove,⁸ and beseeching that the oil be blessed that it may be for a healing from corruption, and that the soul may be renovated and may reject all the works of the devil. The infant is anointed on the forehead, on the stomach, and near the reins. The priest anoints the ears in order that faith may be received by the person anointed. The priest then turns the infant's face to the east.

The godparents are obliged to have charge of the infant together with the father and mother. They believe that a species of consanguinity is entered into which does not allow of entering into marriage with the widow of the godfather; they are like blood relations to the father and mother of the infant.

There is also Confirmation by the chrism, which is founded on II Cor. 1: 21-22.⁹ The chrism is consecrated by the Archbishop, and is sent for a year's use. [Olive] oil is the basic ingredient. It also contains a gum,¹ distilled from the Cassia tree, and Echimata,* Myrrh, and the gum of Labdanum.

⁷ The anointing of the infant with oil is regarded as the baptism of the spirit, and must therefore follow immediately after the baptism of water. This rite is observed also in the Roman Catholic Church, but the Eastern Church holds that this anointing following baptism constitutes the second of the seven sacraments, namely confirmation; while the Western Church defers Confirmation till several years later.

⁸ The reference to the flood and the dove will be clear when it is known that in the Eastern Church the baptismal font is regarded as a

symbol of the ark; while the olive branch brought by the dove as a sign of the abatement of the flood is typified by olive oil which is poured on the water in the font prior to the immersion.

⁹ "Now he which stablisheth us with you in Christ, and hath anointed us, is God; Who hath also sealed us, and given the earnest of the Spirit in our hearts."

¹ In the MS. over the word "gummi" is written a word difficult to read, but which appears to be "cinnamon." We may here note that the Chrism in the Greek Church is composed of olive oil,

[11] The EUCHARIST. The bread is signed with the form of the Cross. It is consecrated, and what remains after the communion is distributed to the people in little pieces; because it is broken; it is called blessed bread. The communion is given, after preparation. For this, these three things are necessary: faith, repentance and charity. They desire that for a short time previously married people shall abstain from congress. There is much controversy concerning transubstantiation. No decision has been made, and therefore it is noted as being among mysteries which are not yet resolved. According to [the confession of] Cyril, the Patriarch of Constantinople, printed in the year 1633,² the church is quite in accordance with the reformed churches; and many persons are of Cyril's belief. But they do not prostrate themselves to the ground before the blessed bread when it is carried to the sick; nor is it carried in procession. There are others who approach the Romans in regard to transubstantiation. They call themselves Latins; those who follow the Roman Catholic dogmas call them Latinophranes.* From

balsam and about forty other ingredients. It is consecrated by the Metropolitan on Maundy Thursday, when the institution of the Holy Supper is celebrated.

² This is not the St. Cyril who was the patriarch of Alexandria in the fourth century, but Cyril Lucar, the patriarch of Constantinople from 1621 to 1638. Cyril Lucar was a determined opponent of the Roman Church and a great admirer of Protestant writings. In consequence he was the object of persecution by the Jesuits, who at one time secured his banishment from Constantinople. In 1627 he obtained a printing press from England for the purpose of printing his Confession of Faith, but the press was destroyed by the Turkish government at the instigation of the Jesuits. He then sent the Confession to Geneva where it was

printed in Latin under Cyril's name, in 1629. In 1633 Cyril published an edition in Greek, and at the same time declared his agreement with the principal doctrines of the Reformed religion. His work and this public avowal led to the convening of a Synod at Constantinople for the purpose of trying him, but before sentence could be pronounced, he was seized by the Janissaries and murdered. In his Confessions, Cyril rejects the doctrine of transubstantiation and teaches that in the consecrated Bread and Wine there is a real but spiritual Presence. Cyril also rejected the doctrine of purgatory and of the possibility of repentance after death. He held moreover that there are but two sacraments, namely baptism and the Holy Supper.

Chrysostom they believe that those who partake of the Bread and Cup can be united by the communion of the Holy Spirit. They call it transubstantiation that Christ has given His own flesh and His own blood in a veil, by the conversion of the bread and wine; and that this is done by bread and wine in two species.³ The bread is prepared of the best flour;⁴ the wine, before being consecrated, is mingled with water, to represent that blood and water flowed out of the side of Christ.⁵ They take the practice of mixing it with water from certain persons in the first centuries. The communion is taken at a table near the altar. When the priest gives it, he makes the sign of the Cross over it three times with a small spear,⁶ and then with this spear he breaks the bread and places it before him on the side. He breaks the bread with the spear three times, and it often goes into little pieces, and at each administration⁷ he says something

³ According to the ORTHODOX CONFESSION, Question 102, when the elements are blessed by the priest "transubstantiation is at once effected, and the bread changed into the true body of Christ, and the wine into His blood, except that, by divine disposition, the appearances remain which are perceived by the sight. First, that we see not the very body of Christ with our eyes, but many rather discern by faith that it is verily so because of Christ's words . . . second, because it is abhorrent to human nature to eat raw flesh," etc. (Schaff, 2 *Creeds* 382-3). It must be noted that this Confession was first adopted in 1643, before the subsidence of the storm of official opposition so carefully nursed by the Jesuits against Cyril Lucar and his teachings. As a fact the Greek Church is not deeply concerned in the dogmatic aspect of transubstantiation. That the substance of the elements is affected seemed to

them self-evident, but precisely how was to them more or less indifferent. What they were mainly interested in was the fact of communion with Christ. At the present day, the Orthodox may decline the doctrine of transubstantiation without any discredit to themselves, but they all retain the idea of the real presence.

⁴ The Greek Church, like the Reformed churches, use leavened bread. The use of unleavened bread was not established in the Latin Church until the ninth century.

⁵ For the same reason it is enjoined that the water which is to be mixed with the wine must be warm (*Orthodox Confession*, Question 107).

⁶ A spear or lance is used in commemoration of the spear which pierced the Savior's side.

⁷ *functionem*. The meaning seems to be that some holy words are repeated as the priest gives the elements to each communicant.

holy. In addition there are many ceremonies in the church. There is then a procession by the priest with the bread and wine which have been blessed; and then there is adoration. The priest first communicates himself⁷ and puts little pieces of the bread into the cup of wine; afterwards he communicates the people.⁸ Before the people receive the sacrament they go off to a certain part of the church, and each one then demands of the others that they forgive him his offences; if one says that he will not forgive him, he does not take the sacrament at that time.⁹

[12] They have THE PRIESTHOOD,¹ which they call a sacrament, on account of the power given to the priest of binding and loosing, of announcing and interpreting the oracles of sacred

⁸ The bread is cut with the spear into small pieces of a triangular shape, and is then put into the wine and water. With a spoon, provided for the purpose, the priest then takes one of the pieces together with a little wine and puts it into the mouth of the communicant who receives it standing and with hands crossed on his breast. After the communion the communicant goes to a small table where he is served by a Reader with a little warm wine and water as a sort of rinsing and also with a tiny loaf of bread. He then places an offering on a salver (Romanoff, *Rites and Customs*, etc., p. 135).

⁹ In the primitive Christian Church many were accustomed to retire to caves or solitary huts during Lent; and before setting out, they took leave of their friends and asked pardon for all their offences. In Russia, at this day, it is the custom at the Lentern Vespers prior to communion, for both priests and people to bid "good-bye" which in Russian is the same word as "Pardon me"; the ancient

custom of asking pardon before communion is without doubt the origin of this bidding goodbye. In the homes, before retiring for the night the same ceremony is observed by the members of the family. The servants also come in and prostrating themselves ask pardon of their master and mistress. The answer given in all cases is never one of personal pardon, but consists in the words "God will forgive you" (Romanoff, *Rites and Customs*, etc., p. 123). The New Church reader will hardly fail to observe in this custom the doctrine known to the Apostolic Church, that repentance or self-examination ought to precede the partaking of the Holy Supper.

¹ "PRETRISE or (*sic*) SACERDOTIUM." The first of these words is one of the several indications that Swedenborg took this account of the Greek Religion from a French work. *Pretrise* is evidently an old spelling (or an error) of the French word *Pretrisse* (priesthood). The same word is used in n. 5 above.

Scripture; also of baptizing, regenerating, purifying from sins, administering the Eucharist, healing those in torment by the holy oil; thus because they are the ministers of God and the dispensers of the mysteries of Jesus Christ. In addition to the priests above mentioned, there are also readers, cantors, candle-lighters. Moreover, there are secular priests who, although married, can also perform the ministry; but if their wife dies it is not lawful for them to take another wife. These men have white tiaras from which, at the back, hangs something like a tail which they call the columba.

There are regular priests who profess chastity;² these are in the monasteries and are of the order of Basil; this is their only monastic order. These are not allowed to eat flesh, and it is enjoined on them to read much and serve much. While in the monastery their life is very austere. Some in the monasteries read the Psalms of David and the liturgy from 4 o'clock in the morning until noon. Mount Athos is the most celebrated monastery.³ This Mount is in their land in Macedonia.

They must make confession of sins four times a year before a priest.⁴ With some this is required only once a year. In the monasteries it is required once every month. The confession of the sick is commanded; it is called repentance; at that time they also promise to amend their life. Priests impose penance

² The Greek Church has the same theoretical attitude to celibacy as the Roman; but much latitude is allowed as a necessary concession to human nature. The lower clergy may be married before ordination. In the Armenian Church this is obligatory for all priests, but in the Russian Church it is obligatory only in the case of parish priests. If the wife dies, however, the priest cannot marry again. In such case, he usually enters a monastery, or takes up secular work. The bishops must observe celibacy. They are usually chosen from the monasteries, or from widowed presbyters. In

Russia celibate priests are called the "black clergy," while the parish priests who are married are the "white clergy."

³ There are a number of Monasteries on Mount Athos; they are rich in ancient manuscripts.

⁴ There are no confessionals in the Greek Church. The priest, when hearing confessions, sits in the open, and generally under some sacred icon or picture. Confession is held as necessary. In Russia all State employees were in fact obliged to go to confession at least once a year (*Romanoff, Rites and Customs, etc.*, p. 130).

by fasts, journies, alms and prayers. With respect to confession they say that there is an angel present who hears. They apply the oil of prayers to the sick and also to those who are in a state of conscience respecting their evils. It is called the Sacrament of the Holy Oil. It coincides with the extreme unction among the Catholics, being founded on James 5: 14.⁵ They believe that the saints intercede for them.

[13] The priests have the right of excommunicating—sometimes for light causes. Because of this, they are held in veneration. The laity greatly fear them, because in this way they are frequently separated from the church. Many direful stories are told about the fate of the excommunicated; these the priests collect, and the collection becomes the basis of their authority.

[14] The Greek Church does not pretend to have any authority or jurisdiction over the Roman Church, nor do they acknowledge that the Greek Church is in any way under the Roman.

[15] THE STATE OF SOULS AFTER DEATH: The Councils of the East have not made any decision in this matter, but the confession of Anatolia⁶ has established the doctrine that after death the soul is borne either to heaven or to hell. It calls heaven Paradise, Abraham's bosom, the Kingdom of the heavens where the saints intercede for the faithful. They call hell a Sepulchre, Eternal Fire, the Pit of the Abyss; and they hold that some there are in chains and some not in chains. They teach that the disposition to justice and repentance and newness of life are confirmed by confession and absolution, and that these seeds of piety are acceptable to God and hence efficacious for salvation; also that they cannot be saved by good works after death. They deny the Limbo of the fathers, and a purgatory as distinct from hell. It was because of this that the fathers of the second council of Constantinople condemned Origen.⁷ But they say something about intercession, that it must have some effect.

⁵ "Is any sick among you? let him call for the elders of the church; and let them pray over him, anointing him with oil in the name of the Lord."

⁶ I am at a loss to know what is meant by the "confession of Ana-

tolia." It may be noted, however, that the teachings here noted are in agreement with the ORTHODOX CONFESSION (Questions 67-8).

⁷ Origen taught the existence of a purgatory wherein spirits might be purged of their evils. For this,

They do not confirm [the teaching] that repentance at the last hour of death is of any efficacy, unless it has been done previously. [They hold] that no authority for any bull can liberate anyone from hell, but that this is done by the grace of God when good works and prayers procure them favor.

[16] They ENTIRELY CONDEMN POLYGAMY. They refuse a fourth marriage, but grant three marriages because three marriages make a unity but four make polygamy.⁸

[17] They have four LITURGIES⁹ and the priests are bound to read them, which they do very rapidly without any thought or understanding.

[18] The Greeks have IMAGES¹ in the church for the sake of

as well as for other teachings, he was condemned by the second council of Constantinople—the fifth oecumenical council, A.D. 553. This condemnation is specially noted in the Orthodox Confession of the Eastern Church (Schaff, 2 *Creeds* 345).

⁸ In the Russian Church a second and third marriage, while allowable, is not looked on with favor; and penance is imposed on those entering into such marriages.

⁹ In the Church in Russia and in those subject to the Patriarch of Constantinople, only three liturgies are now in use, though there have been many others. These three are the liturgy of Basil, the liturgy of Chrysostom, and the liturgy of the Presanctified. The first is used on certain feast days, and the third, for the communion on Wednesdays and Fridays during Lent. It was not considered proper to partake of the holy feast every day during this period of fasting; and therefore during Lent, communion was administered only on Sundays instead of daily as usual. But because many of the people,

accustomed as they were to daily communion, found this a hardship, there was instituted during Lent a Wednesday and a Friday communion as well as a Sunday. Still a difference was observed, in that the elements were not blessed by the priest on Wednesdays and Fridays, but the bread and wine consecrated on the preceding Sunday was used. It is in these services that the liturgy of the Presanctified is used. The liturgy of Chrysostom is the liturgy in ordinary use, being used whenever the other two are not required by the order of the Church.

In addition to the above three liturgies the Church in Egypt uses the liturgy of St. Cyril. This perhaps, is the fourth of the liturgies referred to in the text.

¹ That is, sacred pictures or ikons. These pictures are often set with precious stones and exhibited through a screen dividing the altar, or, as we would call it, the chancel, from the body of the church. Only flat images are allowed, and the church will not tolerate bas-relief, statues, or crucifixes.

ornament and of worship. They have also lamps kindled before them, as before the image of the virgin Mary or George,² and they kiss these images. They look upon sculptured images with horror and pronounce against those who adore them, because it is idolatry. Their condemnation is written, wherefore they do not adore the images but the saints whom they represent. In the churches, there are rarely any other images than those of Christ, Mary,³ Michael and George.

Our author says that the Greek Church invokes the saints and angels; but they implore them to pray for them. They beseech Mary to pray for them, and also the heavenly powers, the arch-angels and angels, and also St. John and the prophets and apostles, the martyrs, saints, ministers of God, the fathers and pastors,* and the learned of the world. They implore intercession; they call upon them not as gods but as friends; not that they are able to bring any help of themselves, but [they teach] that the saints do not hear their prayers or know them but that they are informed of them by revelation, and this of the Divine Grace. These particulars are contained in their confessions.⁴

[19] In the Archipelago there is only one island left to the Christians. This is the island of Tinos. In the other islands are the Turks, and there they are almost without protection.

[20] CERTAIN POINTS OF FAITH: That the spirit proceeds from the Father and thus not by the Son.⁵ They discuss this

² St. George of Cappadocia.

³ The Eastern Church does not accept the doctrine of the immaculate conception proclaimed by the Pope in 1854 and which one of their metropolitans has characterized as blasphemous. In practice, however, the worship of the Virgin in the Greek Church is very similar to the same worship among the Roman Catholics (Schaff, 1 *Creeds* 922-3).

⁴ See Decrees of the Synod of Jerusalem, which were framed partly in refutation of the Confessions of Cyril Lucar. See, in particular, Decree VIII as to images.

The Decrees are printed in Schaff, 2 *Creeds*, p. 401 *seq.*

⁵ This was one of the great points of controversy and the chief doctrinal difference between the Eastern and Western Churches. The latter held that, as the Son proceeds from the Father, so the Holy Ghost proceeds from both the Father and the Son. The language of the Nicene Creed reads: "And (I believe) in the Holy Ghost who proceedeth from the Father." But at the Toledo Synod, two centuries later (A.D. 589) this language was altered to read "who proceedeth from the Father and

subtly. They hold the same books to be apocryphal as the Reformed; however, they acknowledge certain holy traditions. They do not dispute about justification whether it is effected by faith or by works. They declare that faith and works are necessary, and that faith will show itself by works, and that an active life is better than the life of those who spend their time in meditation and end up with bare speculations; also that the active grace of God accompanies faith as a thing to be done and this grace appears as a Divine Fire.* They leave the examination of these matters to those who have greater leisure, more money, and more curiosity.

[21] I have heard that they hold to the procession of the Holy Ghost, and they believe that the Father sends forth the Holy Ghost, but not by the Son.

[22] From the above it is clear that they do not acknowledge justification, and thus neither remission of sins, regeneration and thus salvation, by faith alone.⁶

the Son" (filioque); and anathemas were pronounced against all who denied the doctrine contained in the addition. This led to heated and subtle controversies with the Eastern Church, and has been one of the principal reasons for the separation of that church from the Western, and, in more recent times,

for the prevention of some closer union between the Eastern and the Anglican Church.

* The reading of several words here is very obscure.

⁶ N. 22 (and probably N. 21 also) is Swedenborg's own comment on the above citations concerning the Greek Religion.

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS.

BY EMANUEL SWEDENBORG (*Continued*).

SACRED SCRIPTURE.*

Who, by reason of use, have their senses exercised to discern both good and evil (*Hebr. v, 14*).

MALEBRANCHE *De veritate*.

Beware of ever judging from thy senses concerning things as they are in themselves. Use those senses only to gain a knowledge of how things answer to each other in mutual relation. For verily, our senses are not given us that we may learn things as they are in themselves, but solely that we may learn how far they are useful for our preservation, or hurtful (*L. I, C. v; [p. 22; 1 Eng. 32]*).

ON ERRORS OF SIGHT IN RESPECT OF EXTENSION CONSIDERED IN ITSELF.† . . . Let us hold that we are extremely uncertain with respect to the size of the bodies by which we are surrounded, and can discover nothing by our sight, except the relation, or rather, the comparison of those bodies with our own. . . . Because, for example, the particles of air, and flame, and still more of light, and certain other more subtle matter, escape us, therefore we are prone to suppose either that these particles do not exist, or that they enjoy no force or action. Hence in explaining all the effects of which these imperceptible particles are the genuine cause, we take refuge in occult qualities and imaginary faculties. . . . Our eyes therefore deceive us,

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not only in respect to the size of bodies, but also in respect to their mutual relations (*L. I, C. vi; [p. 23, 28, 31; 1 Eng. 33, 40-1, 44]*).

* Beza's version.

† In this and the following chapter, the first sentence is part of the

heading of a chapter, from the body of which, the words following are taken.

ON THE ERRORS OF OUR EYES IN RESPECT OF FIGURES. WE HAVE NO KNOWLEDGE CONCERNING THE SMALLEST THINGS, NOR ANY ACCURATE KNOWLEDGE CONCERNING THE GREATEST (L. I, C. vii; [p. 31; 1 Eng. 31]). [Painters are compelled to change figures, in order that the latter may seem to the beholders to be in their genuine and natural state; as for example, when they paint] a circle as an ellipse. . . . When we look at a cube, its sides never so project themselves into our eyes so as to produce in the interior of the eye, an image of the same size. . . . When we judge according to our sensing we are always deceived; but on the other hand we are never deceived when we judge according to our conceptions. For the body can teach only the body, but God teaches the truth continually (L. I, C. vii; [p. 31-2, 33; 1 Eng. 44, 45-6, 47]).

We recognize that we are frequently deceived by our sight in regard to the motion of bodies; not infrequently, things which to us seem to be moving, are at rest, and the reverse (L. I, C. viii; [p. 36; 1 Eng. 52]).

[The first way whereby we can judge the distance of objects, is the angle formed by the rays emitted from our eyes, and whose head or apex is the object]. When this angle is very large we see the object quite near; but when the angle is very small then we see the object far away. The mind, therefore, judges of the nearness or distance of objects, according as the situation of our eyes is changed by the various changes in this angle. . . . Our senses reveal things to us only as to their usefulness to ourselves, not as to their intrinsic qualities (Lib. I, C. ix; [p. 38, 43-4; 1 Eng. 55, 63]).

We fall into innumerable errors in regard to light and colors, and also, in general, in regard to all sensible qualities, such as cold, heat, odors, taste, sound, pain, pleasure. . . . [In almost all sensations, four different things are confounded by reason of their being carried on simultaneously and almost in an instant.] The first thing that is confounded is the action of the object; the second is the passion of the sense-organ, or the agitation of its fibres; the third is the passion, sensation or perception of the mind; [the fourth is the judgment made by the mind] (L. I, C. x; [p. 48; 1 Eng. 69-70]).

We frequently attribute our sensations to objects, when the

causes of those sensations are hidden from us (L. I, C. xi; [p. 49; 1 Eng. 72]).

Take the eye of a freshly killed ox; draw off the coats which are opposed to the pupil next to the optic nerve, and put in their place a piece of transparent paper. Then apply the eye to a hole in a window, in such a way that the pupil is exposed to the outer air, and the back part of the eye is in the darkened room. You will then see all the colors [of the objects] that strike the eye, distributed on its internal surface, but in such way that the objects appear upside down. If the colors are not sufficiently vivid, that is, if the objects depicted on the inner surface of the eye are too near; the eye must be lengthened by compressing its sides; but if they are too distant the eye must be contracted (L. I, C. xii; [p. 50; 1 Eng. 73-4]).

In every sensation there is found a modification of our mind arising from what is going on in the body to which it is united. This modification is pleasing, when what goes on in the body is conducive to the circulation of the blood and to the other functions of life; but this modification is distressing, and quite different from the former, when what goes on in the body is capable of incommoding it. . . . Some men are devoted to music, others pay no attention to it; and among lovers of music, some are delighted with one kind of music and others with another, because of the [almost] infinite variety of the fibres of the nerve of hearing, and of the blood and spirits. How different is the music of the French, the Italians, the Chinese and other nations! . . . There are men who find sweetness gratifying, while others are delighted with sourness; some enjoy wine, while others abhor it; and the same man to whom wine was extremely pleasant when he was in health, will find it bitter when in fever. . . . Water is cold to a warm hand, and the reverse. . . . It is very probable that all men do not see the same colors in the same objects (L. I, C. xiii [p. 54, 59; 1 Eng. 80, 85, 86, 88.]).

It devolves upon us to prove that there is no sensation of external things which does not include some false judgment. [This is proved as follows: Our minds cannot be actually in the heavens when we see stars there; nor can they leave our bodies when they see distant houses. Therefore the mind sees stars and houses

where they are not, and yet it sees them placed outside its body. And since the stars which are immediately united to the mind, and which alone the mind can see, are not in the heavens, it follows that all men who see those stars in the heavens, and who spontaneously judge them to be in the heavens, make two false judgments, the one natural and the other free]. The one is the judgment of the senses, or a compound sensation, from which we ought not to judge; the other is the free judgment of the will, from which we are able to abstain, and which therefore we ought to suspend if we would avoid error. . . . It is apparent that among all the things found in every sensation, error lies only in those judgments whereby we judge our sensations to be in the objects (L. I, C. xiv; [p. 61, 63; 1 Eng. 90-1, 94]).

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We have proved that it is a prevailing habit with us, to attribute sensation to objects; and that we judge colors, odors, taste, and other sensible qualities to lie in the colored, perfumed, etc., objects; and we have found that in this we are in error [L. I, C. xvi; [p. 65; 1 Eng. 98]]. We have seen, moreover, that our senses teach us with great safeness and accuracy, the analogies or comparisons of all bodies with our own, although, as we have also seen, we cannot be instructed by their help as to what these bodies are in themselves. . . . Therefore do not ever give complete assent except to propositions most evidently true, and to which you cannot deny assent without plainly recognizing that you would be making very little use of your liberty if you did deny. So help me God, [let no one imagine he has made but small advance if he has learned only to doubt]. To doubt with judgment and reason is no small thing. For, to state the matter candidly, there are two ways of doubting, and there are various causes for doubting. . . . Academics and atheists doubt in one way; true philosophers in another (L. I, C. xx; [p. 75, 76; 1 Eng. 113, 114]).

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TRUTH, GOOD, FELICITY.

MALEBRANCHE—*De Veritate*.

ON THE LAWS TO BE OBSERVED IN THE INVESTIGATION OF TRUTH.

[I] The chief of all these laws is, *Evidence must always be preserved in our reasonings, that the truth may be disclosed without danger of error.* On this depends [the general law]. *We ought not to reason except on matters of which we have clear ideas; [and, as a necessary consequence] that we ought always to commence from things most simple and easy, and to remain in these for some time, before proceeding to an inquiry into things highly complex and difficult. . . . We must have a distinct conception of the state of the question to be solved. . . .*

[II] *By some effort of the mind, one or more mediate ideas must be found, which we can use as a common measure, whereby to learn the relations existing between them. . . .*

[III] *From the subject that is to be considered, all those things must be removed, an examination whereof is not necessary for the discovery of the desired truth. . . .*

[IV] *The subject of meditation must be divided into parts; and all these parts must be considered one after the other, into their natural order, beginning from the more simple, i.e., from those that involve fewer relations; nor must we pass on to the more complex, until the more simple have first become distinctly known and familiarized. . . .*

[V] *The ideas of all these parts must be gathered together, and arranged in the imagination, or written out on paper, to the end that they may no longer fill the capacity of the mind. . . .* They ought all to be compared or brought together according to the laws of combinations, &c. . . . Of all these relations, we must eliminate the useless ones, and we must familiarize ourselves with the others. . . . Special care must be taken, that we be not contented with some false splendor, or with the appearance of truth, and thus be deceived (VI, Pt. II, ch. i [p. 412-4; 2 Eng. 172-4]).

All rash judgments conform with prejudices. . . . There is no one who consults internal truth with that attention and faithfulness that are required, for the pronouncing of true judgments respecting all matters and at all times. . . . A truth

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which at first sight seems to be a ridiculous fancy, may shortly lend itself to approval. When once their eyes have been opened, men consider it attentively, and are held by desire of its recognized beauty. And it may happen that one who condemns an author in respect to some opinion of which he himself does not approve, may perchance come across a man who approves of that opinion to which he is opposed, and who, on the other hand, condemns other opinions which he himself holds as undeniable truths. . . . Men assert, moreover, that he who weighs common opinions in the balance is a rash man; and that he who consults the truth, breaks the bond of charity; since civil societies are held together not so much by truth as by opinion and custom. . . . The learned tenaciously adhere to their own opinions, because they do not deign to examine the opinions of others, if such opinions are opposed to those which they themselves have previously entertained (*Malebranche Præfat. ad Explicat.* [p. 1, 2, 3, 5; 2 Eng. 354, 356, 358, 359]).

DESCARTES.

There may be a clear perception that is not distinct; but there cannot be a distinct perception that is not clear. As when one feels some pain, etc. [For men commonly confuse the pain with their own judgment as to its nature, thinking that in the suffering part there is something similar to that sense of pain, which is all that they clearly perceive] (*Princ. Phil.* I, xlv).

SACRED SCRIPTURE.

Some fine things are said concerning truth in 3 Esdras iv, 31-40.* [Page 38].

* In the English Apocrypha the two books of Esdras (or Hezra) correspond to books III and IV in the Latin Bible; books I and II in the latter being printed in the English Bible as Ezra and Nehemiah. We append a translation from Castallio's version, of the passage cited by Swedenborg: And the third young man "began to speak of the truth: O ye men, Women are exceeding pow-

erful; and the earth is great; and the heaven is high; and the sun swift in his course, for in a day he is borne around the heavens, and in the same day he cometh again to his own place. Is not he great that maketh these things? But truth is greatest and most powerful of all. All the earth calleth upon truth, and heaven also blesseth it; all things fear it and tremble; and in it, is no

IMAGINATION, MEMORY.

ANDR. RYDELIUS, DOCTOR.

The internal sense is twofold, Imagination and Memory.

IMAGINATION is independent and dependent.

INDEPENDENT IMAGINATION is that imagination which does not depend on the external sense, or on other internal senses. It is the interior sensation of an extent, by the force and activity of which sensation, the mind can think concerning the five modes of bodies, namely, size, figure, situation, motion and rest. It is also a general sensation of the state in which the body is, as of sleep, wakefulness, health [vigor], weariness, sobriety, drunkenness, etc.; also of hunger, thirst, inclinations and the various affections of the heart.

DEPENDENT IMAGINATION, namely, that which depends on the corporeal sense, is such in a narrow, a broad and a broadest sense. Rydelius subdivides dependent imagination together with memory, into *lucid* and *ardent*. An image of truth is lucid, but an image of good is ardent. This *good* I call loves.*

IMAGINATIVE MEMORY does not differ from dependent imagination.

MEMORY WITHOUT IMAGINATION is that memory which exerts itself for the repetition of those thoughts that do not belong to the imagination. It is in this way that we recall philosophical axioms, and likewise all our thoughts and reasonings concerning subjects abstracted from matter. For these pure thoughts also, leave their memonic characters in the brain [*Förnufts-Ofnigar*, † P. III, C. vii, p. 156a].

wicked thing. Wine is wicked, the king is wicked, women are wicked, the whole human race is wicked, and all their works are of like wickedness, wherein they perish, being empty of truth. But truth endureth for ever; it liveth and increaseth perpetually. And with her there is no respecting of persons, nor difference; but she doeth that which is just; and she abstaineth from all iniquitous and

wicked things. All men favor her works; neither is there any iniquity in her judgment; and she is the strength and the kingdom and the power and the majesty of all ages. Blessed be the God of truth" (1 Esdras iv, 33-40).

* The last sentence is Swedenborg's comment.

† The English translation of this title is "Necessary Exercises of the Intellect."

Imagination and memory, together with reason, make human genius [*ibid.*, C. iv, p. 94].

[The Peripatetic] philosophers deny reflexion to brute animals, but attribute to them imagination and memory [C. v, p. 111-2].

The character of an idea excites [in the brain] the character of its name [C. lv, p. 107].

Intellectual matters are not comprehended by the memory. . . . For remembering is not the business of the intellect. Therefore one is not a philosopher because he is skilled in the philosophy of others. . . . One gets from the intellect only what one gets from oneself. . . . The science of those who are strong in memory, but not in judgment, is nothing more than literary history [C. iii, Regula 2, p. 122].

We must weigh carefully what belongs to the external senses and what to the imagination. [It is the office of the external senses to procure all possible knowledge concerning the subject under investigation; . . . which must be done under the guidance of the intellect. But active imagination must not be allowed to give information from its own dictation and fancy]. . . . As is done by those who build up a system [not] founded on sensual experience, and enjoy much vogue; but they are finally refuted by experience and reason [Regula 3, p. 123].

AUGUSTINE.

Sense, is that force of the soul which receives the corporeal forms of corporeal things when the latter are present. Imagination, is that force of the soul which receives the corporeal forms of corporeal things, but when they are not present. Sense perceives forms in matter; imagination perceives them outside matter. . . . For imagination arises from sense, and its variation is according to the diversities of sense. The soul sees many things with the carnal eyes; she also conceives many appearances (*phantastia*) with the imagination (*De Spir. et Anima*, C. xi [III, 360B]).

The treasure house and guardian of all things is the memory; nor can this be unfolded, so great is its complexity; and the soul (*animus*) is that memory (*De Spirit et Anima*, C. xxxiv [365C]).

ARISTOTLE.

Phantasy* is something different both from sense and from reasoning. It does not exist without sense; and without it there is no formed opinion. But that phantasy and formed opinion are not the same thing, is very clear; for phantasy is an affection within us whenever we will (*De Anima*, III, iii [II, 46C]).

As we have said before, visions present themselves *before the phantasy* even with the eyes closed. But phantasy is not one of those faculties, like science or the intellect, which always perceive the truth; for there is also a false phantasy. . . . No brutes have belief, but many have phantasy. . . . Since sight is the principal sense, therefore phantasy takes its name from light; for without light one cannot see (*De Anima* III, iv [II, 47BC, 48C]).

[Since all memory implies a time elapsed, therefore] only animals having a sense of time can remember things; and they do this with that part of the soul whereby they sensate them. . . . It is impossible that anything can be understood without a phantasm. The memory which is concerned in intellectual things is not acquired without a phantasm. . . . It is clear therefore that memory is placed in that part of the soul wherein is gathered imagination;† and that things which can come under the imagination, are subjects of the memory; while those which cannot be understood without imagination, are subjects of the memory by accident. . . . By cultivation men preserve their memory and keep it uninjured (*De Memor. et Reminisc.*, C. i [II, 83BCDE, 85B; Bek. 449b, 450a, 451a]).

FROM WOLFF'S *Psychol. Rationalis*.

The phantasms of the soul are representations of the compound in the simple,‡ n. 178. When we imagine a thing, some absent compound is represented in the simple, n. 179. Phantasms§ are images, n. 180. Phantasms of things in the past,

* Phantasia, appearance, imagination.

† Aristotle here uses the same word which the Latin translator has previously rendered phantasia.

‡ That is, are representations of

the compound substances of the world in the simple substance of the soul.

§ Wolff defines Phantasm as "an idea produced by the imagination" (*Psychol. Empirica*, n.93).

are representations of past states of the world, n. 181. Particular sensual ideas and the phantasms of things in the past, involve the entire state of the universe to which they are referred, n. 182. The soul's force representative of the universe tends not only to the representation of the universe as to its present state, but also to the representation of the same as to its past states, n. 183. Particular sensual ideas and the phantasms of things in the past, involve all the antecedent states of the world, n. 184; and also [all] the future states of the world, n. 185. Within our ideas or perceptions are infinite things, n. 186. Perceptions are images which no human art can imitate, n. 189. The soul continually produces an idea of the whole universe, not only in respect to its present state but also in respect to all its states, past and future; but an idea which is continually varied, in accordance with the varying dependence of the present state on past states, and of future states on the present, n. 190. Even in sleep the soul produces an idea of the whole universe such as the wakeful man produces, but an idea that is obscure or totally confused, n. 191. In the soul exists

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an idea of our universe, that is, of the visible world; and this undergoes exactly the same changes as the visible world itself, n. 192. If, by force of the imagination, an idea of a thing previously perceived by the sense, is reproduced anew, a material idea is also reproduced in the brain; which idea arose from the action of the sensible object upon the sensory organ, n. 205. To phantasms answer material ideas in the brain, n. 206. Phantasms are immediate perceptions, n. 207. For exercises whereby the force of the imagination is intensified, we must first choose the nighttime or evening; and especially that time when there are few objects to strike the sensory organs; or the eyes must be closed so that no light may enter, n. 215. The law of imagination must have some reason in the law of sensation,* n. 223. The seat of material imagination is in the brain, n. 228. No phantasy can exist in the soul unless some sensation precede, n. 229. Sensual ideas degenerate into phantasms;

* This statement is referred to in HARMONY OF SOUL AND BODY, by Wolff in a passage (n.613) n.7 (*Psychol. Trans.* p. 29). which is quoted by Swedenborg

and the material ideas answering to them, into material ideas answering to phantasms, n. 231. Imagination is operative, even if sensual ideas are preserved, n. 236. A material idea answering to a phantasm which comes from a sensual idea, perishes when the sensual idea is restored, n. 239. Material ideas answering to ideas that have once been perceived by sense, or formed by our own choice by force of the imagination, are not actually within the brain but only potentially; that is, they are present as regards the possibility of their actually existing, although the object is absent, n. 244. The facility of reproducing the ideas of things which we have previously acquired, consists in some actual change, n. 245. I call those perceptions ordinate, which represent things that follow each other in a constant order. The inordinate are those which represent things that follow each other in no order, n. 249. The faculty of imagination is somewhat limited; that is to say, only a small number of phantasms can be produced simultaneously, n. 258. The field of perceptions, I define as the multitude of simultaneous perceptions, n. 259. There are two kinds of memory; one the faculty of recognizing things confusedly, and the other the faculty of recognizing things distinctly, n. 278. Sensitive memory is the faculty of recognizing reproduced ideas, and the things represented thereby, confusedly. Intellectual memory is the faculty of recognizing reproduced ideas distinctly. Sensitive memory may also be called animal memory, n. 279. Intellectual memory consists in the judgment that we have had the same idea before, n. 281. Intellectual memory supposes sensitive memory; or, an act of the sensitive memory must precede an act of the intellectual memory, n. 282. If a reason for attention is lacking from an act of the sensitive memory, no act of the intellectual memory can follow, n. 284. A perception that arises successively, is distinct *per se*; but a perception, the whole of which arises simultaneously, is not distinct *per se*, but only by an operation of the mind,* n. 287. The material ideas

*Wolff illustrates this proposition as follows: If we hear a word of several syllables, we hear one syllable after another; therefore our perception is distinct *per*

se. But if we look at a tree, the whole tree presents itself to the sight at once; consequently our perception of it, is not distinct *per se*. Nevertheless by the oper-

of words, are of two kinds, since they are perceived both by hearing and by sight, n. 290. To an act of the intellectual memory, answer, in the body, the material ideas of words, whereby is expressed a judgment that we have previously had some idea, n. 295. Memory may be injured by material causes, n. 298. Nothing in the body answers to remembrance, except those things in the same, which answer to imagination and memory, n. 302. If the degrees of the goodness of the memory are varied, the qualities of the nervous fibrils of which the [Page 40].

sensory nerves and the brain consist must also be varied, n. 310. If the memory is injured, the qualities of the nervous fibrils of which the brain and the sensory nerves consist are varied, n. 311. Natural memory, inasmuch as it is in the body, consists of a natural disposition of the nervous fibrils to acquire, by a certain number of productions, the facility of reproducing material ideas, n. 312. He who has a good memory does not necessarily have a large one, n. 315. He who has a large memory has also a good one, n. 316. By lapse of memory we fall into the errors, that the nature of a thing was other than it was, or that things were coexistent which were not coexistent, n. 321. The law of imagination does not take away liberty, n. 355; nor even restrict it, n. 356.

MALEBRANCHE—*De Veritate.*

So great is the relation and agreement between the senses and the imagination, that they ought not to be separated. It will also be clear that these two faculties differ from each other only as the greater and the less. . . . Since the agitation of these [sensory] fibres cannot come to the brain without the mind at once perceiving something, therefore, if the agitation arises from an impression of objects upon the external surface of our nervous fibres, and reaches the brain, then the mind sensates; and it judges that what it sensates is situated extrinsically to itself; that is, it perceives the object as present. But if the internal fibres only are agitated, by the course of the animal spirits, or by some other mode, then the mind imagines; and it

ation of the mind we can make plate its various parts one after it distinct; as when we contem- the other.

judges that what it imagines is not outside but within the brain. . . . This is the difference between sensating and imagining. . . . The mind sensates or imagines nothing new, unless there is some change in the fibres of that same part of the brain [where the nerves meet]. Therefore the faculty of imagining, or the imagination, consists merely in the faculty possessed by the mind of forming for itself images of objects, by inducing some change upon the fibres of this part of the brain; which may be called the principal part, both because it corresponds to all the parts of our body, and because our mind is there immediately seated,—if I may use such an expression. Hence it appears in no obscure way, that the faculty whereby the mind can form for itself images of things, includes in itself two properties; one which depends on the mind itself, and the other which depends on the body. The first is the action and command of the will; the second is the obedience of the animal spirits which engrave these images, and of the fibres of the brain on which these images must be impressed. . . . Following Willis, let the common sense reside in the corpora striata; let the sinuosities of the brain preserve the species of the memory; and let the corpus callosum be the seat of the imagination; or, as Fernelius holds, let this be in the pia mater which invests the substance of the brain; or in the pineal gland of Descartes; or in some other part not yet known to us. . . . The reason for the variety [in the minds of men] depends on the abundance and want, the agitation and slowness, the grossness and fineness of the animal spirits; and on the thinness and density, the humidity and dryness, the flexibility and inflexibility of the fibres of the brain; and finally, on the analogy and suitableness of the animal spirits with these fibres (L. I, C. i [p. 77–80; 1 Eng. 117–121]).

The nature of MEMORY is explained. Like as branches of a tree, if they remain for some time twisted together in a certain way, can afterwards be easily re-twisted in the same way, so the fibres of the brain, when, by the coursing of the animal spirits, and by the action of objects, they have once received certain impressions, preserve for a considerable time, an aptitude for receiving the same dispositions. Now the memory

consists solely in this facility, since we think of the same things whenever the brain receives the same impressions. . . . There is considerable analogy between memory and habit; and in one sense, memory may pass for habit. For as corporeal habits

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consist in the facility that the animal spirits have acquired to pass through certain places of the body, so memory consists in the traces that these same spirits have engraved on the brain; which traces enable us to remember things done in the past. Thus if there were no perceptions attached to the course of the animal spirits and to these traces, there would be no difference between memory and habit (L. II, P. I, C. v [p. 88-90-1; 1 Eng. 135, 138]).

In infancy, the fibres of the brain are soft, flexible and delicate; with age they become dryer, harder and more firm; but in old age they are highly inflexible, gross, and sometimes intermingled with superfluous humors (L. I, P. II, C. vi [p. 91; 1 Eng. 139]).

A young man in a Paris hospital [*Les Incurables*], an idiot from birth, and with all those members broken that are usually broken on the wheel, had lived in that condition for almost twenty years. . . . His condition arose from the mother's imagination, when an ocular witness of a punishment of this sort. . . . A woman who had too intently gazed on the image of a saint, gave birth to an infant with the countenance of an old man. His arms were folded across his breast; his eyes were turned to heaven; he had a very low forehead [because the image of the saint, being raised toward the vault of the church and looking to heaven, had almost no forehead]; on his shoulders he had an inverted mitre with round marks distinguishing the places where mitres are usually set with jewels. In a word, the infant presented a tolerably clear image of the saint. . . . It is certainly true that the traces of the brain excite sensations and ideas in the mind; and that emotions of the animal spirits never exist in the body, without motions corresponding to them being at once excited in the mind. Throughout his whole life, King James of England could not bear to look at a naked sword, because his royal mother, Mary Stuart

[while carrying him in her womb], had seen the lords who slew her Italian Secretary in her bed-chamber. . . . In the brain are two kinds of traces, some being natural or proper to human nature, and others acquired. Natural traces are deep-seated, and it is impossible to entirely efface them; but acquired traces, being less deep, are easily lost. . . . [Although] everything that goes on in the brain of the mother, goes on at the same time in the brain of the infant; and the mother can see nothing, feel nothing, imagine nothing, without the infant at once seeing, feeling and imagining the same thing . . .; yet since these traces are not natural, they are for the most part effaced as soon as the infants come to the light of day (II, P. II, C. vii [p. 95, 96, 100, 101, 102; 1 Eng. 145, 147, 152-3, 154-5, 156]).

Tender infants, equally with adults, are endowed with reason, though they lack experience; they also have the same innate propensities, though they are carried to very different objects (L. II, P. II, C. viii [p. 108; 1 Eng. 166]).

Softness of the fibres occurs for the most part in women; whence it is that they are so skilful in sensible things. It is the part of women to determine the correct style in matters of clothing and speech, and to discern good manners. In such matters they surpass men in knowledge, skill and acuteness. To them pertains everything that is discerned by good taste; but for the most part they are not adapted for penetration into truths that are somewhat more difficult to discover. . . . In the solving of complex and intricate questions they would use their imagination in vain; they see only the surface of things. . . . In a word the manner of things, and not the reality, suffices to fill the whole capacity of their mind. . . . For the most part the mind attains its perfection from the thirtieth to the fiftieth [Page 42].

year. At that time the fibres have contracted no slight solidity, and sensible pleasures and pains hardly act upon them. . . . Still more is this true of old men; with them, the fibres of the brain are much less flexible; and with the defect of those animal spirits whereby new traces are formed, their imagination languishes (L. II, P. III, C. i [p. 108, 111, 113; 1 Eng. 161-2 (*bis*), 166-76 (*bis*)]).

All the changes that are found in the imagination and mind necessarily depend on the changes that occur in the animal spirits and the fibres of the brain. . . . All perceptions, both of the sense and of the mind, are on the analogy (*ex analogia*) of man and not on the analogy of the universe; and the human intellect is like an uneven mirror reflecting rays of things; which mingles its own nature with the nature of the things, and distorts and perverts the latter* (L. II, P. II, C. ii [p. 114, 116; 1 Eng. 168 *bis*, 172]).

As regards what goes on in the brain, sense and imagination differ only as the more and the less. . . . Men are phantastics as to the imagination when they imagine things to be different from what they are, and also imagine many things which are not. But it is manifest that those who are phantastics as to the senses, do not differ from those who are phantastics as to the imagination, except in the matter of more or less; nor is the passage from the one state to the other difficult. . . . Such men go beyond bounds in all things. They extol things mean, magnify things little, make near things remote. Nothing appears to them as it really is. They admire all things and exclaim against all things, without discernment. If they are prone to fear, that is, if their animal spirits are few, weak and sluggish, they are terrified at the slightest cause, and tremble at the shaking of a reed. But if they have a great supply of spirits and an abundance of blood, which often happens, they conceive vain hopes with which they nurse themselves; and, giving themselves up wholly to the fertility of their imagination, they are wonderfully delighted in daily constructing vain plans [they build castles in Spain]. They are vehement in their passions, tenacious in their opinions, and always happy and eager in the contemplation of themselves. . . . If you will believe them, everything belongs to faith; everything is essential,—excepting the things that truly belong to faith, etc. . . . For the most part they speak only of things that are easy and obvious; they use terms that excite nothing but confused notions of the senses, which ever move us most violently; of things sublime and difficult they make only vague mention, and by way of commonplace; for they do not venture to enter

* Malebranche quotes this passage in Latin from Lord Bacon.

deeply into particulars, and to view them from their principles (L. II, P. III, C. i [p. 148, 149, 150; 1 Eng. 224, 229, 230]).

Examples of this communication of imagination are very frequent; in children in respect to their parents, and especially in girls in respect to their mothers; in servants in respect to their masters, and in maids in respect to their mistresses; in pupils in respect to their teachers; in courtiers in respect to their king; and generally in all inferiors in respect to their superiors. . . . For the daughter observes the same style of dress as her mother, and also emulates her walk and speech; if the mother lisps the daughter also lisps; if she has an unpleasant twist of neck the daughter has the same twist. . . . If the religion of a prince be that of his subjects, much more must his reason, which is inferior to religion, be also the reason of
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his subjects. . . . These slender wits* sparkle with a kind of fire; and by some species of liberty and boldness, I know not what, they imperiously dominate the minds of others, and dispose weak imaginations to yield to lively and plausible words, to which an attentive person could not listen, except to despise. They are happy in their words but most unhappy in their reasons (L. II, P. III, C. ii [p. 151, 152, 153, 156; 1 Eng. 234, 235, 240]).

From no other author better than from Seneca, can it be shown how contagious is the imagination of many men who have the reputation of being fine and great wits; and how great the influence these strong and lively imaginations have upon minds that are weak and ill-informed; not by the evidence and validity of their reason, but by a certain lively and elegant turn of speech which depends on the force of the imagination (L. II, P. II, C. iv [p. 165; 1 Eng. 249]).

One who has learned how to combine with some learning, the

* Malebranche is referring to men in all parts of the world, who so easily acquire the reputation of "great wits", and the "contagion of whose imaginations we ought especially to shun." "For (he says) nowadays it needs

only with a certain air of assurance to deny original sin, and the immortality of the soul, or to scoff at some received opinion of the Church, to acquire among the common people the rare title of a great wit."

free and bold manner of speech and action common to nobles, works upon the minds of men with such efficacy, that, whatever the matter on which he passes judgment, he at once commands admiration and assent; so that in most cases there is no opportunity to examine his words, nor even time for the understanding to follow them. . . . The Essays of certain authors are nothing but a rhapsody of histories, tales, bon mots, distiches and apothegms (L. II, P. III, C. v [p. 165; 1 Eng. 253]).

The senses and the imagination are fruitful and inexhaustible sources of errors and illusions; but the mind, acting of itself, is less liable to error (L. III, C. i [p. 177; 1 Eng. 1-2]).

Thought alone is the essential of the mind; sensation and imagining are merely its modifications (*ibid.* [p. 177; 1 Eng. 3]).

Since metaphysical truths and arguments deal with nothing that is sensible, men are not affected by them, and consequently are not convinced of their truth; and yet it is certain that abstract ideas are the most distinct of all; and consequently that metaphysical truths are the clearest and most evident of all truths (*Explicat. ad* L. I [C. X] et L. II [C. vi; p. 25; 2 Eng. 388]).

DESCARTES.

Memory. When the soul wishes to recollect anything, this desire causes the gland to bend itself this way and that, and so to impel the spirits to the various parts of the brain, until they have found that part wherein are the traces left by the object which we wish to recollect. For these traces are nothing else but the fact that the pores of the brain through which the spirits formerly made their course at the presence of this object, have thereby acquired a greater facility than others of again opening themselves in the same way to the spirits that come to them; so that these spirits, again finding the same pores, enter into them more easily than into others. In this way they excite a special motion in the gland, which represents to the soul the same object, and indicates that it is the same as that which it wished to recollect (*De Passion*, P. II, Art. xiii).

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(To be continued.)

THE BRAIN.

BY EMANUEL SWEDENBORG.

(Continued.)

270. 131. As worthy of mention, we note the fact that the veins, both those of the interior cerebrum, which end in this sinus, and those of the exterior, which end in the sinus of the falx, are all so arranged that when the sinus is in its diastole they make a kind of curvature; but when the sinus is in its systole they become straighter. Those which run through the surface of the cerebrum all the way from the arteries to the dura mater, are carried along by a curved flex, as can be seen in the plates of Ruysch and Bidloo; likewise, according to Ridley's figure, those within the cerebrum which pass into the third ventricle. But when the cerebrum is expanded, or the ventricle contracted to a fissure, then from being curved, they all come into a line that is straighter or less curved. This manifestly indicates that when the sinuses are compressed, the blood is contained in a more capacious, because straighter, cavity; for at this time not a drop should be transmitted from them, and unless they changed from their curved figure to one that was straighter, they would easily be ruptured by the pressure of blood.

271. 132. Since, therefore, this fourth sinus is thus forced, by external causes, into its expansion and compression; and since its cavity increases in amplitude, and its tunic in thickness and strength, all the way to the last orifice, we may be allowed to infer that the sinus itself acts in some way, upon its veins and at the same time, by means of the veins, upon the lymphatic duct and the ventricle, but not the reverse; and that its action concurs with the action of the cineritious bodies,—with the action of the nates, testes, pineal gland, and the beginnings and crura of the medulla oblongata, which by the expansion of

the same on that side fall into the cavities and ventricles,—of which matter we shall speak below.

272. 133. As concerns the outlet of this sinus,—which varies in different subjects, being sometimes in the end of the sinus of the falx, sometimes in one arm of the sinus, sometimes in the other, and for the most part, according to MORGAGNI, in the left, sometimes between the two, sometimes by a single, and sometimes by a double opening,—this seems to be due to causes existing in its first formation. For as we may evidently conclude from MORGAGNI'S observations on the Formation of the Chick in the Egg, the blood runs through the longitudinal sinus prior to its emerging from the interior cerebrum through the fourth sinus. The region of the infundibulum is not formed until the last; and consequently the choroid plexuses are for a long time wanting in new-born pups; moreover, the cineritious substance of the beginnings of the medulla oblongata, as regards their striae, does not appear to be fully formed; and consequently it is not fully formed in the thalami of the optic nerves, for the pups are blind for some time. From which circumstances we may be allowed to augur that the fourth sinus comes into existence after the sinus of the falx. Therefore, since the blood is finally extended by this fourth sinus, it would seem to be determined according as need demands, to wit, that the equilibrium of the blood which is to flow from the whole cerebrum into the receptacles of the lateral sinuses and into the jugular veins may be restored; and this, not as regards only quantity but also quality, namely that quantity and that quality which the delicate little body demands from its heart, now growing as to its ventricles, that it may be rightly formed in respect to all its members. But it would be a lengthy matter to go further into causes.

273. 134. Still this blood seems to be somewhat different in quality from the blood that is conveyed through the sinus of the falx; for that part of the blood which runs through the choroid plexuses, seems to lay off only its grosser phlegm (as is the case in the glands of the body) or its serum; but is not dispoiled of its more volatile and highly pure essence, except only that part which returns from the cineritious substances;

and even here, less of it is lost than in the cortex of the cerebrum, where the medulla is abundant. There are also the veins of the dura mater which, according to RIDLEY, also pour in here, and whose blood is not deprived of its volatile and spirituous essence. In the following pages the former blood is called *dry* and the latter *fluid*. For what causes the dryness and fluidity of the blood, is not serum or water and the privation thereof; but it is the volatile and spirituous essence; so that one blood, with its circumfluent and interfluent liquor, should be called dry in respect to that which is vigorous from an abundance of principles, and which, consequently, is more fluid.

274. 135. Deserving also of consideration is the fact that the unloading of this blood through the fourth sinus is due principally to the cerebellum, upon which the sinus is recumbent and with which it is in contact for the greater part of its circumference; consequently that the cerebellum also, as the wife and loving consort of the cerebrum, has public charge over the offices that are carried on in the cerebrum and its ventricles and choroid plexuses; and, moreover, controls, to some extent, even the falx, in that this sinus depends on the falx, the falx on the transverse septum, and the latter on the cerebellum. And all this to the end that all things may still be carried on aright, even when the cerebrum, intent on its own cares, even those of minute detail which exist and can exist outside the volume of its body, seeks to draw its breath more sluggishly and silently. For the action of the whole system depends in general on the cerebellum, while particular actions depend on the cerebrum; for, as was said above, the particular can exist only under its general.

CHAPTER VI.

THE OCCIPITAL SINUS AND THE INFERIOR SINUSES,—THE LONGITUDINAL AND THE TWO LATERAL.

275. 136. *The posterior occipital or longitudinal sinus of the dura mater.* MORGAGNI, being the first investigator of this sinus, it will be well to adduce the description given by this eminent author. In many subjects where the fourth sinus came

to an end (he says), I discovered, likewise coming to an end near the same place, another sinus, not hitherto described by anyone, so far as I know, and called by me, the *posterior sinus*.^{*} In the middle and posterior part of the cranium, from the torcular to the great foramen of the occiput, arises a bony process; and the dura meninx, girding this process, is therefore itself curved inwards into the form of a process,[†]—more dilated and conspicuous in some subjects than in others,—by which the cerebellum is split, as it were, into two hemispheres. It is by this membranous process, therefore, that the posterior sinus ascends, flowing out at the place mentioned above. It takes its beginning in the neighborhood of the great foramen of the occiput, and conveys the blood from the veins belonging to these and the superior places. Instead of a single sinus, and one that invariably occupies one side or the other of the process, I have sometimes observed two sinuses, each pursuing its way on its own side. Although, of the seventeen heads in which I have searched for this sinus, there were five where I saw no trace of it except minute orifices within the torcular,—orifices which did not admit a bristle very far; and although there were four, in which I did not see even these orifices; yet, since the sinus itself was plainly visible in the remaining eight, I do not wish to omit describing it,—seeing that anatomists frequently descant upon the inferior longitudinal sinus, when yet this sinus is not always found, and is for the most part narrower than the posterior. Add to this the peculiar manner of its confirmation; for we have often seen the cavity of our sinus enclosed, not by a conical figure, but by the sides joined together at angles. As a consequence, the sinus is sometimes fortified by certain membranous ligaments stretched transversely, such as are commonly found in the larger sinuses [VI *Advers. Anat.*, ii, p. 3].

THE INFERIOR LONGITUDINAL AND THE LATERAL SINUSES.

276. 137. The inferior sinus of the falx, or the lesser longitudinal sinus, when present, is called by some the third, and by others the fifth sinus. Running almost from the prominent crest in the ethmoidal front (from which comes the superior and

^{*} The small occipital sinus, or sinuses.

[†] The third process or Falx Cerebelli.

larger sinus) and along the lower margin of the falx, it empties into the fourth sinus,—the common trunk for the blood of the interior cerebrum,—near its root and sometimes above; of which it is thus a kind of continued branch or arm, continually increasing in size, but narrow and almost flat. It collects the veins from the inferior texture of the cerebrum, and also those found in the falx which communicate with the superior longitudinal sinus, and those which flow by an oblique turning from the anterior to the posterior parts. This sinus may be seen delineated in Ridley's figure 4, and with it, the superior sinus, the lateral sinuses, and the fourth sinus, with the oblique junctions of the veins into the two [longitudinal sinuses, the superior and the inferior]. In this figure RIDLEY also adds, at both sides of the first sinus, a notable vein arising at about the third part of its distance from the crista galli. But this celebrated author, calls our First sinus, the Third; the two lateral sinuses, the First and Second; and the sinus now under consideration, the Fifth. This sinus, however, unlike the superior, does not run within the duplicature of the dura mater, but within the duplicature of its lower lamina; therefore, by some anatomists it is classed as a vein.

277. The inferior sinus of the falx, says WINSLOW, runs to the lower margin of the duplicature. It is somewhat narrow, and on both sides becomes of a more flattened figure. It communicates immediately with the fourth sinus, and in some subjects appears to be a continuation thereof. It also communicates with the great superior sinus, by means of little veins which pass between them; and consequently with the veins of the cerebrum (*Expos. Anat. Tr. de la Teste*, 39).

278. The inferior sinus of the falx, says HEISTER, seems to me to be by no means a sinus; for its tunics are thin, as in other veins, and its shape is not angular like that of the other sinuses (*Compend. Anat. Nota* 48). Anatomical investigators testify that it is often wanting.

279. 138. *The inferior Lateral Sinuses.* Just as there is a lesser and inferior longitudinal sinus, so also, under the lateral sinuses, are sometimes found two similar sinuses. They lie in the second process of the dura mater, just as the former lie in

the first process. For the most part, however, they are wanting. Near his own sinus,* says MORGAGNI, I have also seen two other sinuses flowing into the torcular, which were carried through the transverse process of the dura meninx; and although I do not think that they can be equally well described, since, in fact, I have not seen them often, yet I have no doubt but that they were true sinuses; and this because, among other reasons, their transverse sections were by no means circular, but were entirely of that figure which, as Valsalva shows, is the figure found in the sections of other sinuses [VI *Adv. Anat.* iii].

280. VIEUSSENS says, that subjacent to each lateral sinus there is sometimes found another and smaller sinus; but that for the most part it is absent, and when found, never runs into the internal jugular vein but into the superior lateral sinus [*Neurographia*, C. ii, and in Manget, 2 *Bib. Anat.*, 117].

281. 139. The three sinuses, described above, seem as though they were wandering and inconstant; for in different subjects they appear and disappear, being merely auxiliary to those sinuses which head the family. If they have no need of these auxiliaries, the four patriarchs alone conduct all the blood of their cerebrum from that side. The *posterior longitudinal* or *posterior† occipital* draws no blood from the cerebellum, but only from the neighborhood of the great foramen, and from the places pertaining to the upper parts. Thus, when this sinus is present, it either shares its blood with the influent and confluent blood of the fourth sinus and of the superior longitudinal, or it takes the blood of its septum from the dura mater. For it opens into the common gulf and gathering-place of all the sinuses, at least by an orifice, and constantly at no great distance therefrom. Hence, when there is too great a confluence of blood, this sinus receives a part and share thereof. For, according to PACCHIONI, the process wherein it lies,‡ rises from the great foramen, in whose posterior§ margin it is firmly inserted,

* The posterior occipital sinus, which was first observed by Morgagni; see n. 275 above.

† The MS. has *superior*.

‡ The third process of the dura mater, called also the Falx cerebelli.

§ The MS. has *superior*.

and thence goes in a straight line almost directly underneath the fourth sinus. From the region of the fourth sinus it is curved over the cerebellum into semi-circular expansions, the outer of which are somewhat larger, and the inner, smaller; and it occupies the greater part of the transverse septum, where it reaches to the border of the almost triangular or oval interstice of the septa. Immediately under the fourth sinus, it is distinguished and strengthened by tendinous expansions or transverse ligaments (*Dissert. binae ad Fantonem*, p. 20). Hence it follows that it is opened when the other sinuses are opened; that the transverse septum acts upon its orifice when the cerebrum or cerebellum stretches it by swelling; and that it is drawn open into the sinus, since by means of a tendinous thread it sends forth its processes on both sides into the transverse septum, and from there bends its fibres over the mater of the cerebellum.

282. 140. The two or three inferior sinuses of both septa, that is to say, the lesser falciform and lateral sinuses, are also diverticula for the blood, when the whole of it cannot be transmitted through the superior sinuses. If, when there is a great abundance, these latter should take the whole, then either the cerebrum would be unable to fall into the alternations of its animation, or the sinus would be ruptured. This is established by the experience of RIDLEY, who found the sinus of the falx ruptured, and extravasated blood lying between the duplicature, and forming a little pit [*De Cerebro*, C. vi *fin*]. To the end, therefore, that all the parts may stand together in case of an excessive afflux and a too slight efflux, a passage opens into these inferior sinuses, the texture of the septa itself also conspiring to this end. Hence the superior and inferior sinuses communicate with each other by veins, and, when deficient of blood, are of a somewhat flatter figure; and the inferior sinus flows into the fourth, and allows itself to be ruled by the action of this latter.

283. The fact that into the inferior sinus flows the superfluous part of the blood, which the cavity of the superior sinus cannot admit,—being hardly perhaps sufficiently capacious even by means of its inferior valvular cells,—is also evident from the vein which is stretched on both sides of the superior sinus, as

may be seen in Ridley's figure [IV ddd]. This likewise gives us reason to suppose that in the excessive swelling of the superior sinus, some part of the blood also flows back into the falx, and is perhaps taken up by the inferior sinus and carried off to the torcular; for when the swollen sinus begins to expel its immediately.

284. 140 [a]. It is also of importance that we know the affections of the animus and the operations of the mind of the subjects in whom these little sinuses are found or are wanting. For if the stream that is forced to flow from the cortical substance through the longitudinal and superior lateral sinuses, is greater than that which flows from the cineritious substance of the medulla oblongata, and from the choroid plexuses through the fourth sinus, then for the equation of these streams there is required a smaller sinus in the falx, which, at the same alternations, shall fill the cavity of the fourth sinus, lest this latter, being empty or poverty stricken, labor in vain. Much blood pours through the cortical cerebrum, when a gladsome mind expands both itself and the cerebrum; much pours through the medulla oblongata and the plexuses of the ventricles, when the nerves of the sensory organs are wearied; and so forth. Therefore, it would be hard to give the reasons for the varieties, without a knowledge of the operations that caused them.

[Here follows Chapter VII on The Sinuses of the Dura Mater, of which only the anatomical citations are preserved. The translation of these citations is omitted for he present.]

CHAPTER VIII.

THE ARTERIES AND VEINS OF THE CEREBRUM, CEREBELLUM AND MEDULLA OBLONGATA.

309. There are two arteries proper to the whole head, namely, the carotids and the vertebals. There are also two veins, the jugulars and the vertebals. Those which enter or leave the cavity of the cranium, are called the internal. But we shall speak of each separately.

310. 154. THE INTERNAL JUGULAR VEIN. The internal

jugular vein, larger than the external, descends from the cells ensculptured in the petrous and occipital bones, as a straight stem, with all the blood of the brains and medulla oblongata, excepting that portion which flows out by the vertebral vein near the great foramen of the occiput. While tarrying at the exit, it receives one or two little branches from the external ear and from the cavity of the tympanum, and sometimes it also receives the internal maxillary. Immediately after its exit it receives another vein called the guttural,* which draws its little branches from the larynx and from the muscles of the scutiform cartilage, especially of the thyroid, and at the same time from the thyroid gland and the muscles in its vicinity, and also from other veins which communicate with the external jugulars. In this way it descends at the side of its vagus nerve, (which transmits to it a number of stamens and after covering it with a species of ligamentous tunic, accompanies it still further downwards) and finally empties into the subclavian, the axillary or the extreme end of the external jugular, (not however in the same way on one side as on the other) and through the cava, transmits to the heart the abundant store of blood returned from the brains. Moreover, by its branches, it has a variety of communications with the external jugular.

311. The internal jugular vein, says WINSLOW, is the largest of the veins that go to the head, though not so large as is represented in the plates.† It ascends behind the mastoid muscle and also the omohyoid, which latter it crosses transversely. It is carried along the side of the vertebrae of the neck at the side of the longus colli, and then betakes itself to the fossula in the foramen lacerum‡ of the base of the cranium. On the way, it sends off small branches to the thyroid glands. About two fingers'-breadth higher up it gives off a medium-sized branch, which runs laterally to the larynx, and is called the guttural vein. This latter divides into three main branches, namely, an inferior, which goes to the thyroid gland and the neighboring

* A name given by Winslow to the second branch given off by the internal jugular in its ascent to the head. (*Anat. Tr. des Veines*, 104-5.) It is now called the com-

mon facial vein.

† Winslow's words are: "not so large as injections make it to appear."

‡ The jugular foramen.

muscles, a middle or lateral to the larynx, and the thyroid and other muscles, and a third which ascends to become the communicating branch between the two jugulars. It somewhat varies, however, in different subjects, and Winslow relates that he has seen the guttural vein springing from the maxillary vein. About the same distance upward, almost directly opposite the hyoid bone, the internal jugular gives out another branch which supplies twigs to the hyoid muscles, and others which communicate with the branch mentioned above. This other branch rises upward towards the parotid gland and the angle of the lower jaw, where it sends off, forwards and backwards, branches that communicate with the external jugular. In some subjects, it is at this place that the internal jugular vein produces the internal maxillary vein and all its ramifications. At the back, this jugular vein gives off a further shoot, which goes to the occiput, where it communicates with a branch of the vertebral vein, and, further on, through the posterior mastoid foramen, with the lateral sinus of the dura mater; but this communication is sometimes effected by anastomosis with a branch of the external jugular, or of the cervical vein. The internal jugular vein then enters the foramen lacerum of the cranial base; but before this it makes a slight bend and transmits twigs to the pharynx and the neighboring muscles (*Expos. Anat. Tr. des Veines* 102-109). The temporal vein is sometimes seen as arising from two origins, the second of which is the internal jugular* (*ibid.*, 98).

312. It should also be noted that the eighth pair of the nerves of the head, the par vagum, [with its filaments] gathered together in the manner of a bundle, passes through the anterior part of the above-mentioned foramen lacerum, where it pierces the dura mater immediately in front of the extremity of the great lateral sinus; and likewise that the passage of the nerve is distinguished from the passage of the sinus by a small membranous septum of the dura mater, and by the little bony productions of the foramen (*ibid.*, Tr. des Nerfs, 104-5).

313. The nature of the ramification of the internal jugular vein from its foramen to the neighborhood of the heart can

* The other origin is the external jugular.

nowhere be better seen than in EUSTACHIUS, Tab. X, fig. 1, where it is shown that as soon as it passes out of the cranium, it receives a considerable venous branch from the muscles of the hyoid and from the tongue; which branch conjoins itself with the frontal bone, or with [the blood] that is carried down by veins from the forehead between the inner corners of the eyes, and over the nose; and also, by a reflected branch, with the temporal vein and the vein of the external ear; this branch being continued, by many complicated ramifications, from the occipital vein. Then, when this jugular has descended lower down, it receives another considerable branch from the scutiform cartilage and its muscles. Still lower down it receives a new branch from the lowest region of the same larynx. In its further descent downwards, a fine off-shoot passes from this right jugular into the left subclavian; into which shoot, as it appears, empty many veins, from the trachea, and at the same time from the jugular vein of the left* side, where it stretches over the mastoid muscle. From the opposite side comes another branch from the region of the scalene muscle. At last, in the subject depicted by Eustachius, the whole of this descending right trunk applies itself to the lowest part of the external jugular, or, by the mediation of the latter, to the subclavian vein of the same side, and empties into the superior vena cava more proximately than the two veins just mentioned; while the left trunk flows into the subclavian at a slightly greater distance from the divarication of the vena cava, and almost above the place where the thoracic duct is inserted.

314. Morgagni's plates show the internal jugular descending at the side of the trachea, and pouring its blood immediately into the superior cava;† also two nerves, the intercostal and the vagus, proceeding in the middle between the jugular vein and the carotid artery, with threads reaching out to these blood vessels from the ganglion of the intercostal; together with branches proceeding from the same vessels, which are distributed to the face and the tongue.‡ See his plates.

315. 155. THE VERTEBRAL VEIN. The vertebral vein of

* The MS. has "right."

‡ *Ibid.*, Tab. 11, fig. 1.

† V *Adv. Anat.*, Tab. 1.

the cerebrum, the vein namely, that enters into the petrous and occipital diverticulum* wherein terminate the lateral sinuses, is distinct from that vertebral vein into which the sinus of the same name empties from the vertebral cavity through the foramina of the cervical vertebrae. The vertebral vein of the cerebrum, which is directed towards the same foramen as the above-named sinuses and the par vagum, seems to draw its blood from the cerebellum and the transverse septum thereof, and from the medulla oblongata. There is also another vein of the cerebrum, likewise called vertebral, which runs out through that singular foramen† not far from the foramen magnum of the occiput, which is sometimes pervious on both sides, and sometimes on one side only. Now and again it is found impervious, and it is supposed that when it is closed on one side the blood is derived towards the other; but since this is a matter of experience, it is left to investigation and ocular demonstration.‡

316. The third branch of the arteries [that go to the dura mater] ascends to the dura mater, says RIDLEY, by the eighth foramen§ of the skull, together with a returning branch of the vertebral vein, at the place where the lateral sinuses enter the

* Literally a "turning aside." The reference is to the depression between the petrous and occipital bones where is situated the jugular foramen; it is also called the *specula rotunda* (n. 294).

† The posterior condyloid.

‡ The vertebral vein proper arises from a plexus of veins at the base of the cranium. In company with the vertebral artery it passes through the transverse foramina of the first six cervical vertebrae and is inserted into the innominate vein on the inner side of the internal jugular. During its course it has frequent communications with the vertebral sinus of the spinal column. The vein itself does not enter the brain; but by its plexiform beginnings it communi-

cates with the occipital vein, which in turn communicates with the occipital sinus. This occipital vein appears to be the vein referred to in the text as "the vertebral vein of the cerebrum" which "seems to draw its blood from the cerebellum." In addition to the communication with the occipital vein, the vertebral receives a vein which leaves the cranium by the posterior condyloid foramen; this, however, is not always the case, since one or other of the condyloid foramina is frequently impervious. It is this vein that is spoken of by Ridley (n. 316) and Winslow (n. 317) and which Swedenborg calls "another vein of the cerebrum, likewise called vertebral" (n. 315).

§ The jugular foramen.

internal jugular, and where the eighth conjugation of nerves* passes out of the cranium (pp. 23-4). The internal jugular enters the skull at the eighth foramen, the vertebral artery at the last and largest foramen† and the vertebral vein at the ninth‡ (which Vieussens erroneously calls the tenth),§ through which it runs into the internal jugular, at that vein's entrance into the round foramen,|| situated at the bottom of the cranium under the styloform process, where it is met by the lateral sinus. There, after advancing to certain venous productions called sinuses, these jugulars descend thence as large trunks, becoming capillary throughout their whole passage, till they meet the extremities of the arteries. In reality they are nothing else than mere branches of the sinuses, and consequently I consider the sinuses themselves as being merely veins of ampler size. (*Anat. Cerebri*, pp. 27-8.)

317. The vertebral vein, says WINSLOW, arises posteriorly from the subclavian, or even from the axillary, sometimes by two stems, sometimes by one, which soon divides into two. The first stem at once produces a branch, called the cervical vein, and distributed to the neighboring muscles, and then ascends through the foramina of the transverse processes of the cervical vertebrae; this branch, however, sometimes comes from the axillary vein. [The other stem ascends on the side of the vertebrae,] and in the neighborhood of the fourth vertebrae it insinuates itself between the transverse processes of this vertebrae and that of the fifth, in order to unite with the first stem. Thus the vertebral vein, sometimes by a single offshoot and sometimes by many, accompanies the vertebral artery through all the foramina of the transverse processes of the neck, all the way to the foramen magnum of the occiput, communicating with the occipital veins and the small occipital sinuses of the dura mater. On the way it gives off a branch, which passes through the posterior condyloid foramen of the occiput, and communicates with the lateral sinus of the dura mater; but which is not always

* The par vagum.

† The foramen magnum.

‡ The posterior condyloid foramen.

§ The MS. has "eighth" but this is an error.

|| The jugular foramen.

met with (*Expos. Anat. Tr. des Veines*, 110-4). But more of this when we come to treat of the medulla spinalis.

318. In his table xviii, fig. 1,* letters A and C, VIEUSSENS delineates the vertebral vein flowing down outside the bony column, parallel to the vertebral sinuses; together with a cut-off branch [AA] the source of which he does not indicate, except as regards two venous canals [cc], of which he says that they emerge from the posterior part of the coarse meninx, and empty the blood over which they rule, into the vertebral veins into which they pass (Manget, 2 *Bib. Anat.*, p. 623). As far as I know, however, Vieussens was not yet aware of the particular origin of that vein which is likewise called vertebral, and which, according to all the anatomical tables, pours its blood into the internal jugular. In his figure XXXIX, Verheyen seems desirous of bringing this vein all the way to the subclavian between the jugulars.†

319. 156. THE REMAINING VEINS OF THE INTERNAL HEAD. The remaining veins of the internal head have not, as yet, been distributed into their order by anatomical explorers; for part of them has escaped ocular experience, or has deceived observers. Many, however, which perhaps were concealed from WILLIS and VIEUSSENS, have been drawn forth from their crypts and labyrinths by RIDLEY; but their existence must be learned not so much from the words of anatomical authors, as from their figures, which are equally eloquent.

(1) In Vieussens' Tab. VII,‡ [fff etc.] are drawn "six venous branches, which after emerging from the interiors of the cerebrum terminate in the fourth sinus, and empty into its cavity the arterial blood which they have re-absorbed; and this in regular order above the pineal gland, between that gland and the inferior sinus of the falx" (Manget, II *Bib. Anat.*, p. 145).

(2) In his Tab. III,§ are shown "two cut-off veins [HH]

* In Manget, 2 *Bib. Anat.*, Tab. LXXXVI, fig. 1.

† In the figure referred to in Verheyen's *Corp. Hum. Anat.*, the two vertebral veins (ff) are shown running between the two internal jugulars (ee) and emptying

into the right and left subclavian respectively.

‡ In Manget, 2 *Bib. Anat.*, Tab. LXII, fig. 1.

§ In Manget, *ibid.*, Tab. LX, fig. 1.

which tend from the choroid plexus found in the fourth ventricle of the cerebrum, and from the posterior and upper part of the cerebellum, towards the fourth sinus;* and at the place where they terminate in this sinus, they are bent from forwards backward, lest (as he says) the blood which they carry back to its cavity obstructs the motion of the blood returning from the interiors of the cerebrum" (*ibid.*, p. 119). They are, however, presented differently by RIDLEY in his figure iv., where he delineates two ample veins, of which one (as he says) enters the fourth sinus over the second process of the dura mater,† so as to resist the course of the blood in its ascent to the torcular; while the other, upon the same process, is designed to hinder its descent to the internal jugular.‡ This is contrary to the arrangement of vessels mentioned by Vieussens in his table III, HH (*Anat. Cerebri*, pp. 205-6).

(3) In Vieussens' tables vi, vii, viii, ix, xii, xiii,§ are shown certain considerable vessels with their branches, in the anterior ventricles of the cerebrum, both on the fundus, and also on the roof; together with some in the fourth ventricle; of which vessels we shall speak when we treat of the Choroid Plexuses; so likewise in Ridley's figure v., between the thalami of the optic nerves and the corpora striata, almost above the medullary tract that runs between them, but nearer to the corpora striata, and with their offshoots extended in that direction.

(4) In this same drawing, Ridley also shows "two ample veins running along the whole length of the third ventricle, from the upper apex of the plexus down to the other branch of the plexus, and terminating in the fourth sinus"; besides other veins over the cerebellum, one of which [R] is seen "entering into the lateral sinuses." Small veins are also observed on the fornix, and elsewhere (*Anat. Cerebri*, pp. 209, 210).

* The MS. has "ventricle."

† The tentorium.

‡ In the figure the first vein enters the straight sinus *from* the direction of the torcular, and at an acute angle, while the second enters the lateral sinus also at an acute angle but with a flow

towards the torcular. Thus the action of the one is against the flow of the blood *to* the torcular, while the action of the other is against its flow *from* the torcular.

§ In Manget, 2 *Bib. Anat.*, Tab. LXI, fig. 1; LXII, figs. 1, 2; LXIII, fig. 1; LXIV, figs. 1, 2.

(5) In the same author's second figure there are "divers veins communicating with the shorter or inferior sinuses of the sella equina"; besides others which communicate with the lateral sinuses; together with arteries of the dura mater, [h, i, k] (*ibid.*, p. 201); these are also represented by Vieussens in his table xvii.* In Ridley's fourth figure, two veins [dd] are discovered on either side of the longitudinal sinus of the dura mater which extend towards the fourth sinus (*ibid.*, p. 204).

(6) In Ridley's first figure [pp] are seen other arteries, as it were; and still others, bent into angles upon the cerebellum, where the latter produces the annular process.

(7) In his fourth figure [pp], and also in Vieussens' second† [DD] are seen the surfaces of veins which enter the superior and the inferior longitudinal sinuses of the dura mater by an oblique insertion at the side, and in the process of the falx.

(8) Besides these, Ridley in his tables, makes mention of a "very small vein, not hitherto observed, which, accompanied by its artery, passes through the lateral part of the sphenoid bone where this constitutes a portion of the orbit, exactly under the small process of that bone"‡ (*Anat. Cerebri*, Ch. IV ad fin.).

320. Would that others, after Ridley and Vieussens, would show like industry, in following up the venous threads among the windings of the cerebrum, towards their exits into the sinuses. All who cultivate the medical art and demand this aid,

With threefold honors would extol such men.§

Meanwhile it should be mentioned, that the arteries and veins in the brains are circumstanced entirely differently from the arteries and veins in the body; for in the brains the one does not accompany the other, either in its progress, or in its egress.

* In Manget, 2 *Bib. Anat.*, Tab. LXIII, fig. 3, TT, XX.

† In Manget, 2 *Bib. Anat.*, Tab. LIX, fig. 2.

‡ This vein is not shown in Ridley's figures. The description

is quoted from the text of his work, where he adds that the vein in question comes to view when the anterior lobes of the cerebrum are lifted up.

§ Horace. Odes I, i, 8.

(To be continued.)

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No. 3.

TRANSACTIONS

OF THE

TWENTY-FIFTH ANNUAL MEETING

OF THE

SWEDENBORG SCIENTIFIC ASSOCIATION.

The twenty-fifth annual meeting of the Swedenborg Scientific Association was held at the First New Jerusalem Church of Philadelphia at 22nd and Chestnut Streets on Friday, June 2, 1922.

AFTERNOON SESSION.

The meeting was called to order at 3 o'clock, the Rev. L. F. Hite presiding. 28 members and 4 visitors were present.

The Rev. Chas. W. Harvey, on behalf of the Philadelphia Church, gave a brief address of welcome to the Association, together with an expression of appreciation of the work being done by the Association.

Upon motion the reading of the minutes of the twenty-fourth annual meeting was dispensed with and they were adopted as printed in the NEW PHILOSOPHY for April 1921.

The Chair then appointed the following **committees**:

COMMITTEE ON NOMINATIONS: Messrs. L. E. Gyllenhaal and Chas. W. Harvey.

COMMITTEE ON THE ROLL: Mr. R. W. Brown.

The report of the **Board of Directors** was then called for, accepted, and ordered filed.

Mr. Doering then briefly stated reasons for increasing the number of members of the Board of Directors from seven to ten, and presented the following motion :

That Article 4 of By-laws be amended to read :

Ten members of the Board of Directors in place of seven.

The report of the **Treasurer** was then called for and Mr. Doering presented a report and chart showing a general increase in the uses of the Association, with an increase in membership of fifty-four for the year. Mr. Doering explained that such increase was largely due to the active solicitation of the President and the Editor of the **NEW PHILOSOPHY**.

The report was accepted and ordered filed.

Dr. Boericke reported that the Treasurer's statement had been audited and found correct.

The report of the **Editor of the New Philosophy** was then called for, accepted, and ordered filed.

It was then moved and carried that we proceed to the **election of officers**.

The Committee on Nominations thereupon reported as follows :

For President—Rev. Lewis F. Hite.

For Board of Directors: Messrs. Alfred Acton, Felix A. Boericke, R. W. Brown, C. E. Doering, W. Howard, H. Pitcairn, Edward Randall, John Whitehead, D. A. Whittemore.

The Secretary was instructed to cast the ballot for the above nominees as officers of the Association, whereupon they were duly declared elected.

Mr. Acton then presented the following **memorial resolution** :

AT THIS, the first meeting of the Swedenborg Scientific Association since the death of ALFRED H. STROH, M.A., we the members of the Association write to testify our deep appreciation of the great and lasting work which has been accomplished by Mr. Stroh in furtherance of the work we have at heart. Mr. Stroh has been an active member of the SWEDENBORG SCIENTIFIC ASSOCIATION from its very inception. For many years he acted as its representative in Sweden ; and as such, he took a leading part in the movement that led to the publication by the ROYAL ACADEMY OF STOCKHOLM of Swedenborg's

OPERA COSMOLOGICA. He has also superintended the copying of the Swedenborg manuscripts now in the possession of the SWEDENBORG SCIENTIFIC ASSOCIATION and from time to time has communicated to the Association the results of his Biographical and Bibliographical researches. In all these works Mr. Stroh has distinguished himself for detailed accuracy and thoroughness, and the results of his life's work stand now as a lasting monument to his memory. And we the members of the Swedenborg Scientific Association but anticipate the sentiment of posterity in expressing our appreciation of the faithful labor of Mr. Stroh and its rich results.

Resolved that a copy of the above resolution be spread upon the minutes of the Association and also that a copy be sent to Mrs. Alfred Stroh, of Stockholm, Sweden.

The resolution was unanimously carried by a rising vote.

The President of the Association, the Rev. Lewis F. Hite then presented the **Annual Address** on Swedenborg's Early History of the Soul.

The paper was briefly discussed by Messrs. E. E. Iungerich, R. W. Brown and Stockwell.

Prof. R. W. Brown then read a paper on the **History of the Theory of the Origin of Water from Air, and Earth from Water.**

It is unfortunate that the length of the papers presented prohibited a full discussion that the interesting treatment of the subjects involved naturally merited. In the too brief moments that remained, however, Messrs. Harvey, Stockwell, Howard, Acton and Iungerich commented on certain aspects of the paper. The meeting then adjourned at 6 o'clock to meet at 7.30 o'clock p.m.

EVENING SESSION.

The meeting re-assembled at 7.30 o'clock p.m.

Mr. Acton read a paper by the Rev. H. S. Conant on **A New Churchman's View of Evolution.**

Mr. Stockwell spoke of the timeliness of the subject due to the present interest in Evolution and the collection of new scientific data.

Mr. Harvey spoke of the Biological continuity of species and also of evolution within species.

Mr. Hite suggested that we should keep in mind the distinction between the doctrine of Evolution and the doctrine of creation. Biological evolution is a natural history record.

The discussion was continued by Messrs. W. H. Alden, R. W. Brown, W. Howard, Alfred Acton and Dr. B. Boggis.

Mr. Stockwell then presented a paper on **Cosmic Contrasts**, in which he developed the doctrine that nature is the same in greatest and in least. He cited the comparatively recent work of Professor Aston and others in connection with Isotypes as a remarkable confirmation of certain of Swedenborg's Principia doctrines, suggestive of atomic structure. The paper was well illustrated with diagrams, showing the relative sizes of corpuscles composing the electron, etc.

Time permitted only a brief discussion of Mr. Stockwell's presentation. Mr. Acton expressed his appreciation of the paper and spoke of its value as a distinct contribution to the thought of the Church.

Mr. Cranch spoke of the value of such scientific investigation in confirming the truths of the Church, and the need for it in our educational work.

The meeting then adjourned at 9.30 o'clock p.m.

WILFRED HOWARD,
Secretary.

REPORT OF BOARD OF DIRECTORS.

1921-1922.

Since the last Annual Meeting, four meetings have been held, namely on May 27, 1921, September 22, 1921, March 2, 1922, June 2, 1922.

At the meeting of May 27, the following officers were elected:

Vice President, Dr. F. A. Boericke.

Treasurer, Prof. C. E. Doering.

Editor of New Philosophy and Literary Editor of the Association, Prof. Alfred Acton.

Secretary, Mr. W. Howard.

At the meeting of September 22, it was decided to appoint Mr. Greenwood as Agent of the Association in London.

At the meeting of March 2, it was decided to publish in booklet form Mr. Acton's treatise on the Origin of Man and Evolution.

At the meeting of June 2, a motion was passed, expressing appreciation of the work of Mr. Acton as Editor of the *NEW PHILOSOPHY*.

It was decided to hold an adjourned meeting of the Annual Meeting at Urbana this year.

It was decided to recommend to the annual meeting that the number of members of the Board of Directors be increased from seven to ten.

WILFRED HOWARD,
Secretary.

OFFICERS OF THE ASSOCIATION.

At a meeting of the Board of Directors held after the Annual meeting, June 2, 1922, the following officers were elected:

Vice President, Dr. Felix A. Boericke.

Treasurer, Prof. C. E. Doering.

Editor of New Philosophy and Literary Editor of the Association, Prof. Alfred Acton.

Secretary, Mr. Wilfred Howard.

TREASURER'S REPORT.

FOR THE YEAR ENDING MAY 31, 1922.

Receipts.

Dues	\$ 317.50	
Subscriptions to New PHILOS-		
OPHY	117.17	
Sale of publications	222.51	
Contributions	335.00	\$ 992.18
Balance on hand, May 27,		
1921	85.49	<u>\$ 1,077.67</u>

Expenditures.

Printing and mailing 3 issues		
NEW PHILOSOPHY	\$ 309.99	
Binding Psychological Tracts		
and Express	58.34	
Books bought at half price	10.55	
Sundry expenses	16.17	
Editorial expense	11.57	\$ 406.62
Balance on hand, May 31,		
1922	671.05	<u>\$ 1,077.67</u>

Balance includes Royal Academy Publications \$ 10.00.

Dues unpaid 1922	\$ 102.00
Subscriptions unpaid 1922 ..	38.00
Dues unpaid 1921	48.00
Subscriptions unpaid 1921	17.00
Dues unpaid 1920	7.00
Subscriptions unpaid 1920	3.50
	<u>\$ 215.50</u>

7 in arrears for 3 yrs. dues	
and subs.	\$ 38.50
26 in arrears for 2 yrs. dues	
and subs.	102.00
39 in arrears for 1 yrs. dues	
and subs.	75.00
72 owe dues and subscriptions	<u>\$ 215.50</u>

Membership.

Net membership reported 1921	206
New members	54
	<u>260</u>
Resigned	2
Lapsed	7
Died	3
	<u>12</u>
Net membership May 31, 1922	248

The number of paid subscribers to the NEW PHILOSOPHY is 257, of which number 245, or 43 more than last year receive it at half price, and 12 who are not members of the Association, pay in full.

Respectfully submitted,

C. E. DOERING,

Treasurer.

Audited and found correct, June 1, 1922:

F. A. BOERICKE,

Auditor.

REPORT

OF THE

EDITOR OF THE NEW PHILOSOPHY.

Since my last report three numbers of the NEW PHILOSOPHY, namely April, July and October, 1921, have been published in a single issue. The numbers for January and April, 1922, have been in the printer's hands for some time and should have been in the subscribers' hands several days ago, but they have been delayed for some unaccountable reason. It seems best, however, to include the contents of these issues in the present report, which will thus bring the report of the NEW PHILOSOPHY up to date.

The contents of the five issues just alluded to are as follows:

Transactions	12 pp.
Articles	91 pp.
The Brain	28 pp.
A Philosopher's Note Book	27 pp.

News	1 p.
Editorial Notes	7 pp.
The Greek Religion	14 pp.
	<hr/> 180 pp.

The item The Greek Religion consists of a translation of some notes by Swedenborg which are included in his manuscript of the Index Biblicus, phototyped copies of which have recently been received in this country. They seem to consist of notes made by Swedenborg on the occasion of reading some French work, treating of the religion of the Eastern Church, together with some comments by Swedenborg himself. They have never before been transcribed or translated.

It is satisfactory to report that since the last meeting of the Association the printers of the NEW PHILOSOPHY have resumed their former practice of holding without charge the type for reprint. This will enable us to continue work on the Philosopher's Note Book and the Brain. Of these two works only a comparatively few pages have been printed during the last five issues but translations are already prepared so that provision is now made to print instalments during the coming year. It is very desirable that at least one of these books shall be ready for publication as early as possible and with this in mind we propose to push the translation of the Philosopher's Note Book.

Respectfully submitted,

ALFRED ACTON,

Editor.

Bryn Athyn, June 2, 1922.

COMMUNICATION TO THE
GENERAL CONVENTION OF THE NEW JERUSALEM
IN AMERICA.

TO THE GENERAL CONVENTION OF THE NEW JERUSALEM.

Dear Friends,

It seems wise and useful that the general bodies of the New Church should be informed in respect to the activities of other bodies working directly in the sphere of the Church. For this reason the SWEDENBORG SCIENTIFIC ASSOCIATION desires to communicate to your body some account of the work which it has accomplished and is now carrying on. And such a communication seems especially appropriate and desirable when we consider that our membership consists for the most part of active workers in the two general bodies of the New Church existing in the United States and Canada, of which the General Convention is one.

The SWEDENBORG SCIENTIFIC ASSOCIATION was established in the year 1898, for the purpose of translating, publishing and studying the philosophical works of Emanuel Swedenborg; and in 1906 it became a chartered body under the laws of Pennsylvania. At the meeting for organization in 1898 the Rev. FRANK SEWALL, D.D., was elected President, a position which he held from that time to the day of his death in 1915, when he was succeeded by the present President, the Rev. Professor L. F. HITE.

During the twenty-four years of its existence the receipts of the Association have amounted to over \$11,500, of which about \$11,000 has been spent.

The Association has procured copies of the Swedenborg manuscripts on Salt, Copper, Silver, Vitriol, and anatomical subjects, and also two large manuscripts on Miscellaneous Notes, Sketches and Drafts, etc. One of these latter manuscripts is now being published in the NEW PHILOSOPHY as A Philosopher's Note Book. The publications of the Association include the Latin text of DE SALE COMMUNI; a number of

translations of Swedenborg's philosophical works, including seventeen of his earlier works, most of which had never before been published; a little Tract on the FLYING MACHINE; a CLASSIFIED LIST of all Swedenborg's writings up to the time of the Arcana Celestia; and a facsimile edition of the Auctioneer's CATALOGUE OF SWEDENBORG'S LIBRARY; the FIVE SENSES; the FIBRE; and PSYCHOLOGICAL TRANSACTIONS.

The FIVE SENSES constitutes the first draft of what Swedenborg proposed to publish as volume three of the Animal Kingdom. He did in fact publish this third volume but it contained only the chapter on touch and an apparently unfinished chapter on taste. The work published by the Association is therefore the first appearance in English of Swedenborg's complete doctrine on the five senses.

The FIBRE was written as a continuation of the Economy of the Animal Kingdom. It was prepared for the press by the author, but was never published. The translation published by the Association is therefore the first appearance in English of Swedenborg's doctrine concerning the fibre and its diseases.

The PSYCHOLOGICAL TRANSACTIONS, which is the latest work published by the Association, includes a revised translation of eight small works on the Soul, the Spirit and the Blood (previously published as "Posthumous Tracts,"—now out of print); a new translation from the original manuscript, of the HIEROGLYPHIC KEY, previous editions of which were based on faulty texts; and translations of Swedenborg's hitherto unpublished writings on FAITH IN CHRIST and on CORRESPONDENCES AND REPRESENTATIONS.

The total publications of the Association comprise over 1800 pages and are an exceedingly valuable contribution to the study of Swedenborg's philosophy.

The SWEDENBORG SCIENTIFIC ASSOCIATION has concentrated in itself the largest part of the activity of the New Church as directed to the publication and study of Swedenborg's philosophical writings. It has therefore not only itself published Swedenborg's works, but has also influenced the publication by others of texts and translations prepared by its own members. Thus: TREMULATION translated by the Rev. C. Th.

Odhner, *ONTOLOGY*, translated by the Rev. Alfred Acton, and the *WORSHIP AND LOVE OF GOD* translated by Mr. Alfred H. Stroh, were published by the ROTCH TRUSTEES; *GENERATION*, translated by Rev. Alfred Acton, was published by BOERICKE AND TAFEL; and finally the first three volumes of the handsome series, *OPERA QUÆDAM*, contemplated by the ROYAL SWEDISH ACADEMY OF SCIENCES to contain the original texts of all Swedenborg's scientific and philosophic works, were edited with great care by the late Mr. Alfred H. Stroh. These volumes are of great value, as they make accessible to the student many important texts which had previously existed only in manuscript.

There is still a great amount of work that remains to be done before the student can have before him the full material for the study of Swedenborg's philosophy. The Association is now publishing in the *NEW PHILOSOPHY* a *PHILOSOPHER'S NOTE BOOK*, to which we have already alluded. In the same way it is also publishing a translation of Swedenborg's first work on the Brain, a work that has never before appeared in print. When this work comes to be published in book form, the Association hopes, if funds can be provided, to reproduce all the anatomical plates referred to in the work. With one or two exceptions, plates have not hitherto been included in publications of Swedenborg's physiological works, the omission being due probably to lack of funds. Yet, as every reader knows, plates are necessary to the full understanding of Swedenborg's text, and this applies with especial force to his work on the Brain inasmuch as suitable plates illustrating the more minute anatomy of the Brain are not easily available to the great majority of students. Among the works that yet remain to be published are the Latin texts of the manuscripts copied by the Association, as well as the texts of the *ANIMAL KINGDOM*, the *ECONOMY OF THE ANIMAL KINGDOM*, *MISCELLANEOUS OBSERVATIONS*, etc., which have been out of print for over one hundred and fifty years. There is also a large manuscript work on Mathematics and many hundreds of pages on physiological and philosophical subjects, to say nothing of the need of reprinting translations that have long been unobtainable.

We desire moreover to publish translations of Swedenborg's little known literary works. Of these, perhaps the most interesting is the *SELECTAE SENTENTIAE*, a thesis published by the author in 1718, in which he makes interesting and learned comments on sundry moral sentences cited from Seneca and Publius Syrus. The publication of this work would be of very general interest.

The Association is deeply appreciative of the help it received from the *CONVENTION* in the beginning of its work. That work is now going on. We have endeavored to give you some idea of its nature and extent, in the hopes that we may continue to receive the moral and intellectual support which is so necessary to the continuation of our work. The use of that work is evident. For while there may be difference of opinion as to the exact value of Swedenborg's earlier writings, there can surely be no doubt in the minds of competent judges that those writings should be made available for study; it is only thus that just judgment can be made concerning them. So far as the physiological and cosmological writings are concerned their unique value has been attested to by the learned men of Sweden and elsewhere, and greater surely must be their value to the New Churchman, giving him the means to more fully confirm the truths of religion by the writings of one who from a Philosopher was prepared to become a Revelator.

LEWIS F. HITE,
President.

MEETING OF THE SWEDENBORG SCIENTIFIC ASSOCIATION AT URBANA.

Members and friends of the *SWEDENBORG SCIENTIFIC ASSOCIATION* in attendance upon *Convention*, met at the call of the President in Lyceum Hall, Urbana, Ohio, on June 16, 1922, at 8.00 o'clock p.m. There were about twenty persons present. The Rev. George Dole acted as Secretary.

The President gave a brief account of the annual meeting of the Association in Philadelphia. He gave a resume of the encouraging reports of the Treasurer and of the Editor of the

NEW PHILOSOPHY and spoke of the work which the Association is undertaking to do. He referred especially to the "Philosopher's Note Book" now being published serially in the NEW PHILOSOPHY. The publication of this work, he said, will for the first time give students the opportunity to follow Swedenborg's studies in the history of philosophy.

The President then read his annual address, as delivered in the meeting in Philadelphia, but in abbreviated form owing to the shortness of time at the disposal of the meeting. Remarks on the address were made by the Rev. John Whitehead.

The Rev. John Stockwell then read his paper on Cosmic Contrasts, but again, and for the same reason, in abbreviated form. This paper is an interesting and suggestive attempt to draw a parallel between the latest results of the study of the constitution of atoms and Swedenborg's Principia theories. The paper aroused animated discussion and in answer to questions Mr. Stockwell described at considerable length the laboratory methods of studying the constitution of atoms.

The last paper was read by the Rev. H. S. Conant on A New-churchman's View of Evolution, being a survey and an adverse criticism of the traditional doctrine of evolution from the point of view of some of the latest exponents of biological history. In contrast with the theory of Evolution, the paper presented the doctrine of creation by correspondence. The paper was followed by some interesting remarks by Rev. George Dole but the lateness of the hour prevented any general discussion.

During the meeting an appeal was made for members, and subscriptions to the amount of \$16.00 were received. A similar appeal was made to the body of the Convention, but up to the present the results are not known.

LEWIS F. HITE.

PRESIDENTIAL ADDRESS.

SWEDENBORG'S EARLY DOCTRINE OF THE SOUL.

BY LEWIS F. HITE.

Swedenborg's doctrine of the soul is unparalleled in its thoroughness and range; it grew with his growth and culminated with the highest reach of his spiritual philosophy. The doctrine as a whole presents two very distinct phases or stages, characterized by two widely different points of view. It is therefore of peculiar importance that we should proceed, in the study and exposition of the doctrine, chronologically, and separate the two markedly contrasted periods of Swedenborg's own development and of his consequent treatment. The stages correspond in general to the periods before and after his illumination, that is, the opening of his spiritual senses and his introduction into the spiritual world. The doctrine of the former period is contained in three carefully elaborated statements, namely, *The Introduction to Rational Psychology*, the chapter on *The Soul in the Economy of the Animal Kingdom*, and in the *De Anima*, or *The Rational Psychology*. The later stage of the doctrine is presented incidentally and in a fragmentary fashion in the *Arcana Celestia*, with much important supplementation in the subsequent books, especially in *Apocalypse Explained* and in *Divine Love and Wisdom*. A convenient and important summary is given in *Intercourse between Soul and Body*. The contrast between the two periods is marked by the different points of view, and by difference of subject matter. In the earlier, the point of view is that of physics and physiology, and a supreme effort is made to reach a knowledge of the Soul through a very highly developed mechanical philosophy. Physics and physiology are conceived and presented in terms of a particle theory. The aura particle is the first element of physics, and the Spirituous Fluid, somehow derived from the aura, is the first element of physiology. The Soul enters the body as or through the Spirituous Fluid or Animal Spirit. At this point, there is a highly complicated concep-

tion of physiological and psychical functions, but the constant effort is to conceive and express the nature of the Soul in mechanical terms, in terms of the mechanics of particles. In the later period, however, the doctrine passes over quite abruptly to the spiritual point of view, first taken, and stated incidentally, in the *Spiritual Diary*, and consistently maintained throughout the remainder of his works. Here, the doctrine of the Soul becomes a part of his newly conceived and universal doctrine of Love. From this point on, the Soul is thought of and described as love in substance, quality, and form; and as the one most perfect finite recipient of Divine Love, which is God-Man, the Lord. This phase of Swedenborg's doctrine of the Soul is distinctly new both in psychology and in metaphysics. In spite, however, of the thoroughgoing contrast and the utterly different points of view, much of the thought of the former stage is taken over and made constitutive in the latter. This would have to be fully brought out and constantly made available in any adequate treatment of the later, spiritual, phase of the doctrine. But for the present purpose of giving a brief account of the earlier doctrine, we may neglect for the time being the relation between the two, however vital its importance for a just appreciation of the doctrine as a whole. In view, then, of these considerations it is convenient to limit the scope of this essay, and accordingly I have chosen as the title "Swedenborg's Early Doctrine of the Soul."

It is well known to all who are familiar with Swedenborg's scientific career that the constant stimulus and undeviating purpose of his monumental work in physiology was the determination to get an adequate knowledge of the Soul through an intimate and exhaustive knowledge of its dwelling place and instrument, the body. In pursuit of this object, he familiarized himself with the foremost physiologists of his day, and with the latest results of experimentation; then with marvelous industry, penetration, and intellectual power, he built up a system of physiological and psychological doctrine, amazing in its far-reaching attainments and its completeness. During the ten-year period from 1734 to 1744, after he had completed his work in the field of chemistry and physics, he wrote and

in part published under the general title of "Animal Kingdom" a series of volumes which were alone sufficient to give him a unique position in the history of science, sufficient in the eyes of modern experts to establish his fame as the most eminent physiologist of his day and in some respects distinctly in advance of the physiology of our own time. While as a psychologist, we have the judgment of a competent reviewer in the American Journal of Psychology, who selected the "Rational Psychology" as the best specimen of Analytical Psychology in the whole field. Such testimony of well-informed and highly trained experts as to his extraordinary achievements in both physiology and psychology is assurance enough to the uninitiated that Swedenborg's early doctrine of the Soul may be thoroughly and comprehensively studied with every prospect of fresh interest and enlightenment.

In a previous address to this body, afterwards published in the NEW PHILOSOPHY of July, 1917, I made a general survey of Swedenborg's work in this field, and traced in outline the progress of this early doctrine from its beginning in the *Chemistry* and *Miscellaneous Observations*, and even in the *Principia*, through the *Economy of the Animal Kingdom* and the other books of this period to the *Rational Psychology*. At the close, a preliminary discussion of Swedenborg's psycho-physical doctrine was presented. The full nature of the task of expounding this early doctrine was indicated by the statement that the "whole doctrine of the Soul as Animal Spirit, and Animal Spirit as the Soul, needs to be worked out in detail with a very complete historical physiological, and psychological equipment; for at this point Swedenborg comes nearest to current psycho-physical theories, especially the Behavioristic theories." It is with the hope of stimulating such an enterprise that the present essay is undertaken.

Swedenborg's scientific and philosophical interest in the problem of the Soul was first fully aroused by the difficulties he encountered in working out his theory of nature, that is, of the physical world. As is well known, his preliminary investigations and interpretations recorded in the *Chemistry* and in the *Miscellaneous Observations* were followed by the systematic

developments of the *Principia*. It is evident from the hesitant manner with which he put forward his theories in the former works that he realized the epistemological and metaphysical difficulties he was facing. He was especially embarrassed by the lack of adequate mathematical nomenclature and the deficiencies of the language he had at his command, which was, of course, Mediaeval and Scholastic Latin. In fact he projected, in the end, a *Universal Mathesis, or Mathematical Philosophy of Universals*, a sort of universal logic, anticipating, in idea at least, the later Boulian system of Symbolic Logic—a shorthand device for overcoming the deficiencies of ordinary language, both mathematical and philosophical.

It is one of the surprising things about Swedenborg's advanced achievements that he had such a clear conception of the nature and function of hypothesis in scientific progress. His distrust of theorizing in general, and of his own in particular, apart from verification in experience and by experiment, was quite in line with the present most advanced scientific position. Already in the *Miscellaneous Observations* we find him, in 1720, putting forward a caution in the midst of a tentative statement of his Bullular Hypothesis. His well-chosen and highly significant language is: "For my own part, I dare not yet advance this bullular hypothesis as true, for it is difficult to strike out any genuine novelty of undoubted truth regarding invisibles. Doubt must always attach, unless all the data we possess at present and all that may be discovered in the future, coincide mechanically with the hypothesis; or unless an ocean of such particles, large enough to be visible, can be formed, and it can be shown geometrically that they have the same properties as the invisible particles of the same figure. There is still an infinity of data with which we are unacquainted; therefore I submit this opinion as a hypothesis."

This remark is as applicable to present-day science as it was to Swedenborg's time; and students of Swedenborg should learn their lesson from him and try to be as broadminded, as free from prejudice, as modest, as clear-sighted as he was. Towards the end of the statement of the hypothesis, he pauses to remark and to re-affirm his attitude with genuine scientific

modesty in the words: "But as we are treating of invisibles, and as thought and geometry are alone at our service in the investigation, so we will submit our views to the criticism of the learned; and if they can bring forward facts to refute our notions, we shall receive the information in the most grateful spirit."

The next period and stage of theorizing was that of the *Principia*. The attempt to work out the Bullular Hypothesis in detail brought Swedenborg face to face with the question of origins, in particular the origin of the physical world. The serious student of Swedenborg's science should keep constantly in mind that almost at the opening of his scientific career he developed his particle theory to quite an advanced stage. He returned from his first travels abroad in 1714, was appointed Assessor in the Royal College of Mines in 1716, established and edited the first scientific magazine, *Daedalus Hyperboreus* in 1716, and continued it to 1718. In the meantime he devoted himself to the superintendence and study of mining operations; and extended his studies systematically by observation, experiment, and advanced theorizing in all branches of science connected with his business, such as geology, chemistry, physics, mathematics, and lastly cosmology. The results of these studies were presented in a series of papers of extraordinary originality and scientific interest, and published under the title of *Prodromus Principiorum Rerum Naturalium* (A Forecast of the Philosophy of Nature) in 1721. Parts of this work were translated into English and published in 1847 as "Specimens of a Work on the Principles of Natural philosophy, Comprising New Attempts to Explain the Phenomena of Chemistry and Physics by Geometry." One distinctive merit of this work was the new and systematic application of geometry to the study and exposition of Chemistry and Physics.

Already, then, about 1720, we find Swedenborg projecting a cosmogony; and in the early part of the work above mentioned he presented in complete outline his particle theory of matter and of bodies, which he afterwards elaborated with systematic thoroughness in the *Principias*. The early and provisional sketch is summarized in Part IX (see *Chemistry* p. 16)

on the Theory of Water. The paragraph opens with this succinct statement: "We think that the particles of water belong to the sixth kind of hard particles. According to our *Principles*, . . . where, after the demonstration in the preceding articles, it may be seen: 1. that the particle of water is round, 2. that on its surface there are crustals of the fifth kind, 3. that again on their surface there are crustals of the fourth kind, and so on to the first kind, and at length to mathematical points, or to atoms composed of points".

Here we come to the difficulty of conceiving the first natural point, or that body to which we are led in the final analysis of the bodies of our ordinary experience, and with which we must begin in following the process of nature in building up the physical world. The two *Principias* are systematic attempts to solve this problem and work out its presuppositions, the one preliminary, the second final. The difficulties encountered in his attempts to solve this problem led Swedenborg to an investigation of the *nature of knowledge* and the *nature of the Soul*. This is impressively foreshadowed in the first paragraph of *The Minor Principia*, which sketches "A Philosophical Theory of the Origin of Natural Things." The first and preliminary consideration presented in approaching the problem of the origin of the physical world is the question, *what kind of knowledge* do we actually have, or can we attain, of the physical world. He submits the alternative of either a resort to occult qualities, or to the presupposition that this world is through and through mechanical; the latter alternative is adopted and argued on the basis of the principle that nature acts in the same way in leasts as in greatest, and therefore it is assumed that the invisible bodies are mechanical in the same sense that the visible bodies of which they are the constituents are mechanical. In other words, the question is "whether the mind ought to be content with occult qualities, or with those that are placed, as it were, in the light of geometry," and if "there is nothing in nature that is not geometrical, then the origin of nature and geometry must be acknowledged to be the same". Here, then, is the position at which Swedenborg arrived in his strenuous effort to think out the problem of origins to the

farthest limits of thought, and it is most interesting to follow closely his struggle to get clearness and finality. He saw that in one view the origin of geometry is the point; for the line can be thought of as made up of points, the plane, of lines, and the solid, of planes, but the origin of the point itself presented a problem of still higher order and difficulty. He saw that the point which he took to be the common origin of geometry and of nature could not be thought of as self-originating, and he tried to get a clear conception of that which *precedes* the point. This effort led in two directions, the one psychological, the other metaphysical. In the psychological direction, it led to the fact that the point is in one aspect a conception, and therefore has its origin in the mind; in the metaphysical direction it led to the attempt to conceive that form of reality which preceded the point and furnished the *conditions* for its origin. In both these directions, Swedenborg proceeds with exquisite deliberation. The point, considered geometrically, though the origin of geometry, lies itself outside the body of geometry, antecedent to the geometrical relations established by means of it. The situation is highly involved, and it is very difficult to put it in a concise statement. Swedenborg puts it as follows: "In geometry, the mathematical point is the primary entity. . . . And thus geometry takes its rise from a formless and imponderable point as if from something unknown. Geometry can describe the nature of the point only obscurely by means of words. It cannot be said at all to have substantiality, since it gives *birth* to the line, the area, and by manifold motion, a solid. . . . Geometry, however, is not in fault, since the primary entity is hardly capable of being defined except by bare words; it cannot be visualized".

This is another way of saying that the point has no dimensions, it is "formless and imponderable"; and is, therefore, a presupposition of geometry rather than one of its constituents, for geometry is properly and strictly concerned with dimensional relations; and so, geometry itself is *from* something antecedent to and unknown to geometry, unknown in the sense that it cannot be defined in geometrical terms, in terms of dimensional relations. The point cannot be said to have sub-

stantiality, for it precedes and gives birth to the substantials, the line, the plane, and the solid; considered objectively, these are the substantials of geometry. A distinction was here evidently hovering in Swedenborg's mind which he recognized but did not make explicit. It is one of the many cases where his thought went beyond the ideas and the terms of his day; and as he proceeds he becomes more and more conscious of this. In the present case he tried to overcome this difficulty and to make the distinction involved clear by saying that the point is unknown to geometry, and yet is the origin of geometry. His own way of saying this is: "Geometry can describe the nature of the point only obscurely by means of words. . . . Geometry, however, is not in fault, since the primary entity is hardly capable of being defined except by bare words; it cannot be visualized". The distinction here marked is that between what can be conceived and what can be visualized. Geometry objectively considered is a system of visualized relations, such as lines, planes, and solids, but subjectively geometry is a system of conceptions; in other words, a body of knowledge, knowledge of conceptual relations. The distinction between geometry as a body of visualized relations and geometry as a conceptual system hovers in the background of Swedenborg's discussion here; and it marks the transition in thought to the next step in advance taken in the *Principia*, and furthermore it forces an entrance to the doctrine of knowledge there presented.

In the metaphysical direction, the nature of the point is still more complicated. Here the mathematical point, which is the origin of geometry, must be identified with the physical point, which is the origin of material bodies. This itself presents a stubborn difficulty; but when we undertake seriously to question the *origin* of the physical point, we come face to face with one of the standing problems of metaphysics. We find ourselves in front of a blank wall beyond which there is, physically speaking, an absolute void. For when we try to think back of the material point we pass to the realm of the immaterial, where in terms of physical entities there is nothing. This situation raises the question, what is the nature of our knowledge

of that which precedes the point and furnishes the conditions of its origin? We have here obviously the problem of creation, especially the creation of the world of nature. It is important for us to see how fully Swedenborg appreciated the problem that confronted him, and how thoroughly he worked his way through it. Let us therefore turn to his statement on pp. 3-4, *Minor Principia*. He says: "If we wish to think of the nature of the world before its existence or creation, when as yet there was no matter, nor even the point, . . . then we must conceive of it as being absolutely empty, or that in place of the world there was a kind of immense void in which nothing whatever existed which would seem capable of giving rise to matter. . . . Consequently, our philosophy or reasoning concerning the beginning of things ought to go still further back, and consider whether in that absolute void something may not be comprehended that could give origin or birth to some entity from which the line, the surface, and the solid might be produced." This comes very near saying that empty space is the condition for the origin of the point. But, of course, he saw that empty space could not be the origin of anything; he therefore looked for the origin of the point in that which is geometrically and physically indefinable, and that something he undertook to describe as infinite and as motion. Obviously the infinite is indefinable in mere space terms, that is in terms of absolute void. On the other hand, ever since Heraclitus, the human has tried to see in motion the ultimate physical reality, and to think of motion as antecedent to matter, or body. Bergson may be said to be the next successor of Heraclitus, and is now the protagonist of this view. Furthermore, the outcome of modern physical analysis tends to the position that motion precedes matter, and is the origin of the ultimate particles of matter; in other words, that the ultimate entities of the physical world are centers of force. This is in substantial agreement with the view that Swedenborg is here trying to make clear.

But let us turn to Swedenborg's own statement of the case; his words need to be taken seriously and pondered throughout. We quote in part: "If a kind of void be granted in which nothing existed that could move in a material and geometrical

sense, much less produce anything, then it must be entirely infinite, and have existed before geometry; this was primitive nature which obeyed no geometrical laws, such as are known to us, . . . there is nothing here except what is infinite and beyond our comprehension. Nor does the matter seem capable of being expressed in any other way than this, that the beginning of regular and geometrical nature was an immense void, and that the primary origin was only infinite motion in an infinitely small point. But in using such an expression we seem to be trifling with words, since we cannot form a conception of infinite motion apart from something moving or moved, nor of such motion in an infinitely small point where there is no place; so that two infinities are here supposed: in motion, the infinite of velocity; and in place, the infinite of smallness. And because such infinity cannot be apprehended geometrically, we must, consequently, all things considered, have recourse to an infinite of a certain kind; and we must recognize *Natura naturans* (self-active Nature), or a Supreme Will and Prime Mover, who is without any geometrical attribute or quality and who alone is greatest and least infinite motion, and who by his own infinite motion in an infinitely small place gives the point its origin, and from this point geometry takes its beginning and the first laws of its order, according to whose rules the whole of nature is then directed ”.

This lands us in the midst of the opening discussions of the *Principia*. It brings us face to face with the critical situation in the general theory of creation, the transition in thought from the Creator to the created, from the Infinite to the finite. As we have seen, Swedenborg here begins to appreciate the fact that he must first, at least in a preliminary way, deal with the problem of knowledge, before undertaking to put his theory of creation in final shape. The question is, therefore, what knowledge of this transition are we capable of attaining? Or, in particular, how can we conceive the origin of the point? And, furthermore, what is the nature of our knowledge of the physical world and how is such knowledge possible? This, we observe, is just the antithesis of Kant's famous question, how is knowledge *à priori* possible; and it shows a deeper insight into the problem of knowledge than Kant had.

Swedenborg's analysis of the nature of bodies, geometrical and physical, led him to the conception of the first natural point. The course of this analysis is similar to that of Early Greek philosophy, which had for its triumphant outcome the atomic theory. This theory lies at the basis of all materialistic thinking about the origin and nature of the world; it is the historical origin of the particle theory of matter. Swedenborg's advance here beyond the atomic theory, or any particle theory, was his refusal to take any form or kind of material particle as either uncreated or as self-originating. He saw, as Zeno's criticisms really showed, that the atomic theory was based upon an arbitrary limitation of the divisibility of matter, and that the legitimate outcome of any particle theory is infinite divisibility, in other words, a vicious indefinite regress. But he took the futility of infinite division as a ground for asserting that the finite presupposes the infinite and that the material point is not self-originating, that it had an origin other than itself. And yet, the methods of differential and integral calculus suggested to him a way of passing in thought from an infinitely small to a finite quantity. There are three critical stages, or transitions, in this discussion; and three crucial terms are introduced. First, we have the transition from the thought of the physical universe to the thought of an immense void; next, the transition from the void to the infinite; then, from the thought of *something* infinite to the thought of a certain kind of infinite, namely, infinite motion. So far he keeps within the bounds of nature, but nature taken in the enlarged sense, including both existence and origin.

First, we must examine the transition from the thought of the physical world to the conception of an immense void. The idea of an original void seems to be one of those primitive conceptions with which the human mind begins cosmological speculation. Classical instances are, the void of Genesis, the chaos of Hesiod, and the void and formless infinite of Milton. We gather from these instances that it is natural to the human mind to think of an immense void as preceding the actual existence of the world; the void itself is taken as original. Swedenborg makes the thought articulate, and takes a step in

advance by defining the nature of the void and giving it a positive character. Let us try to follow closely the course of his thought. "If", he says, "we wish to consider what the world was before its existence, or creation, when as yet there was no such thing as matter, not even a point, whose motion or flow could beget a line or a solid, then we may conceive it not otherwise than that which was in the highest degree empty; or think that, in the place of the world, there was a kind of immense void, in which there was not even the least thing which might seem to give us the origin of matter".

In other words, we have the alternative of thinking of the world as having no beginning whatever, or thinking of it as having its beginning *in* something or *from* something which preceded it. There are at least two compelling reasons for taking the second alternative: the principle of infinite divisibility makes the first alternative futile, and so untenable; in the second place, there is in fact a kind of existence other than matter, namely spiritual, and this in thought, at least, precedes matter. These two considerations seem to have been presupposed in Swedenborg's thought; and therefore he adopted at once the latter of the alternatives without discussion, and went on to define the something which preceded nature as its origin. He described it as a kind of immense void, that is, it was completely void of all material existence. Here we come to the first of our critical transitions, that from the world of bodies to the void. We almost inevitably take this "immense void" as empty space. But we must remind ourselves that Swedenborg very positively and consistently denied that there was any such thing as empty space in reality, and he is careful to use here the significant expression "*a certain kind* of immense void." The special and critical significance of this qualification is that it takes us beyond the interpretation of the void as mere empty space to a realm of positive and efficient character. This then is the transition in thought, here proposed, from the world of material bodies to an immeasurable kind of existence, void of, other than, material existence. The transition rests upon the demand for an origin of the material world, in particular the

origin of the material point, and upon the implicit denial of the reality of empty space. "Consequently, our philosophy or reasonings about the beginnings of things ought to go still further back and consider whether *in* this supreme void something may not be understood which could serve as the origin of the kind of entity from which the line, the surface, and the solid could be produced".

Here we approach the transition from the void to the infinite, and the difficulties of language still beset us. The void has just been described as that in which nothing could move in the material and geometrical sense, still less produce any thing geometrical or material. It would be, therefore, not merely geometrically but for the moment conceptually indefinable, that is, "entirely infinite." The word infinite stands for one of the most puzzling conceptions in the history of thought. It began, probably, with the idea of chaos and void. Certainly in Early Greek Philosophy, it began with Anaximander's idea of "The Boundless," meaning that nature is a boundless body. Aristotle both clarified and complicated the conception, that is, he analysed it, cleared up its obscurities and ambiguities; and showed its complexities. Swedenborg seems to have appropriated Aristotle's conception of the infinite as that which is not of the kind to be measured geometrically, and also as that which has a positive character with the attribute of infinity. In other words, he passed from that which is void of matter, and so indefinable in terms of matter, to that which, to use Spinoza's expression, is infinite in its own kind. This latter he described as altogether infinite. His next step was to give positive character to this infinite, and to state what it is that is infinite. This is the transition to infinite motion.

The nature of motion has been a constant puzzle to human thought. Scientific analysis seems to tend inevitably to the conception of motion as the precondition of matter. Even the atomic theory had to endow the atom with the utterly foreign character of motion. Common knowledge vacillates between the conception of motion as a universal having real and independent existence, and as a property of bodies. In other

words, we ordinarily think of motion as the motion of some body, but we also just as habitually think of it apart from bodies and as acting upon bodies. Swedenborg's treatment of motion tends to emphasize its independence; at the same time he recognizes the common view that motion is the motion of some body or other. That is, he makes a characteristic distinction between what may be called mechanical motion and the motion which mechanics presupposes. He naturally, therefore, passed in thought from the mechanical world, the physical world, to the realm of pure motion, motion apart from and antecedent to the world of bodies. We see, then, that when Swedenborg looked beyond the physical world for its origin he saw two facts, the fact of the infinite, and the fact of motion. Both of these were for him implied by the nature of the physical world, when considered as to its origin. The transition from the infinite to motion is made by identifying them in the subject-predicate relation; the special kind of infinite here demanded is the infinite of velocity, and the kind of motion demanded is the motion of the infinite. Thus Swedenborg seems to pass directly from the physical world to infinite motion as its primary origin, whereas he really passes from the idea of the infinite in general through the idea of a special kind of infinite to infinite motion.

Having cleared away some of the difficulties of the transitions by pointing to the conceptual background and motives, and by interpreting the terms in accordance with the demands of the situation, we have now to see how Swedenborg conceives the reality of infinite motion where there is nothing moving or moved, and especially infinite motion in an infinitely small point where as yet there is no place. His first step, as we have seen, was to put this infinite in a realm other in kind from that of geometry; then he conceived it as what the scholastics called *Natura naturans*, self-active nature; and finally, he referred this to a Supreme Will and Prime Mover. Here, of course, we are on the ground of Aristotelianism, in the theory that all movement implies an unmoved mover. Swedenborg naturally identified the Supreme Will and Prime Mover with God, all-active, all-powerful, omnipresent, the

same in greatest and in least. In fact, God was the presupposition of his thought from the beginning; he made no pretence of arguing from nature to God, but he did think and undertook to show that the origin of the physical world must be sought in the nature of God, especially in His infinity and in His activity. God as the creator was presupposed at the outset, and the task was to follow the process of creation. The process is summed up in the statement that we must in any case acknowledge God, who is without any geometrical attribute or quality, who is alone greatest and least infinite motion and who by His own infinite motion in an infinitely small place gives origin to the point from which geometry has its beginning and the first laws of its order, according to whose rules the whole of nature is then directed. In short, the conception of God's activity as infinite, and as the same in greatest and in least furnished the formula "infinite motion in an infinitely small point." We note with regret that the translation here is faulty throughout; the word space is used to translate *punctum* and *locus* instead of point and place. The idea of space does not enter Swedenborg's discussion and is entirely foreign to the course of his thought. Swedenborg appreciated fully the difficulties under which the discussion labored both as to terms and as to ideas, and he realized that the expression "infinite motion in an infinitely small place" was mechanically absurd and inconceivable; but he stoutly insisted, and argued acutely and consistently, that some kind of motion was implied in the very nature of the case. In other words, the origin of the physical world is inconceivable apart from the idea of a pre-existent motion. His argument is merely sketched here in the first section of the *Minor Principia* but it is elaborately developed in the *Principia* proper. It is, however, not the purpose of this paper to reproduce or to expound this argument, but only to point out its connection with the doctrine of the Soul which grew out of the philosophy involved in it, and especially the theory of knowledge to which it led.

The *Principia* opens with two discussions of the utmost importance to every serious student of Swedenborg's works,

and it is one of the most surprising things in the history of attempts to read his scientific works that no one has given serious attention to these discussions.

The first deals with the nature of knowledge, or as Swedenborg calls it, the "True Philosophy," and also with the ideal wise man, the "True Philosopher"; the second takes up the discussion of the "Minor Principia," and deals more at length with the "First Natural Point," that is, with "infinite motion in an infinitely small point" and carries the particle theory to completeness. With the latter discussion we are not now concerned, but with the former we enter upon our proper task.

The opening sentence of the first chapter is as follows: "If there is a proper connection between the mind and the organs of its senses, or in other words, if man is truly rational, he continually aspires after wisdom." In this sentence we have a condensed statement of Swedenborg's psychology at this period; it is likewise a forecast of his theory of knowledge. The truly rational man according to this ideal is one whose Soul is properly connected with the senses by the rational mind. In this view, man is a threefold organism of Soul, mind, and body. The mind itself has a twofold aspect, or a twofold constitution, the rational mind and the animal mind, in Latin the *mens* and the *animus*. The peculiar mark and essential characteristic of man is the desire for wisdom, and this desire is formed and directed by the Soul. The Soul seeks through the senses the wisdom of Nature, but it is through its higher faculties, the two minds, that it penetrates to the inmosts of Nature, to the realm of the invisibles and the simple elementary particles. It is this knowledge of Nature that Swedenborg here calls "philosophy," and the means of acquiring this knowledge he sums up as Experience, Geometry, and the faculty of reasoning.

The connection between the Soul and the body is the special theme of Swedenborg's early doctrine, and the discussion, very completely outlined here in the introductory chapter of the *Principia*, is a striking anticipation of his whole philosophy of man and his environmental universe. The connection is established by the fact that there is in the sense-mind, the *animus*, a desire to know the external world. This desire

is the presence of the Soul in the senses, and is really the desire of the Soul operating in and through the senses. Nevertheless, there is a certain degree of independence between the senses and the Soul, such that while the senses exercise perception from the Soul, the Soul on the other hand exercises its perception from the senses. The situation is well summed up by Swedenborg as follows: "The Soul wishes to be instructed by the senses, and to be always perceiving something by means of them as if by what is other than itself; while the senses in their turn desire to exercise their perception from the Soul, to which they present their several objects; and thus both act and contribute to the same common task, and make for the same end, that the man be wise. For this purpose also the Soul is connected with the body by a continuous process, and reason is added to the senses; thus it is a mark and characteristic of man to wish to be wise. If, however, one does not struggle for and aim to gain a wisdom above and beyond the senses, he is not truly rational, nor is there a due connection of his senses with his Soul" (p. 1). Here we observe that the link between the Soul and the bodily senses is reason, the perception of relations. This perception of relations, the rational mind, is also, as well as sensation, a function of the Soul; and as such is a second intermediary between Soul and body. We have now four terms: the Soul (*anima*), the rational mind (*mens*), the sense mind (*animus*), the body (*corpus*). It is one of the difficulties of Swedenborg's treatment that scholastic Latin and scholastic thought, following Aristotle, represented these several functions as separate, as well as distinct, faculties; in fact, as more or less independent entities. This language and this way of thinking adds very much to the difficulties of treating the mutual relations of Soul and body intelligibly, and it makes the reading of Swedenborg uncertain as well as difficult. In the case before us, we have four terms, four faculties, which have mutual relations with each other; the Soul is connected with the rational mind, the rational mind, with the sense mind, and the sense mind, with the body. These connections themselves involve intermediaries, just as the connection between

Soul and body involved one intermediary and then another. And so we get another series of faculties, perception, imagination, conception, thought, intuition, which further complicate the relations.

Now, according to Swedenborg, all this body of faculties comes into operation in the pursuit of wisdom; and wisdom here means the wisdom of nature and its three kingdoms, the mineral, the vegetable, and the animal. But beyond these as the background, or the source from which they proceed, is the elemental kingdom, the kingdom of the elements, air, ether, and others, and the world of the ultimate particles of which the elements are constituted. The deeper wisdom of nature, then, a truly philosophical knowledge of nature, is the knowledge of the mechanism of the elements, and especially the knowledge of the invisible world of particles. This invisible realm—invisible of course to the naked eye, but visible to the eye of the mind when supplied with suitable apparatus—was for Swedenborg the real world of nature, and the desire for a knowledge of nature led back to and was completely satisfied only by a fully developed science of this invisible kingdom. In his own pursuit of this knowledge, he was keenly aware that he was entering an unexplored territory, and that his only guides were experience, geometry, and the light of reason. But, here too, he faced with open eyes what he called the thick darkness of elemental nature, as well as the densest ignorance as to the intimate workings of the human mind. It was the nature of knowledge itself and the possibility of attaining the kind of knowledge he was in pursuit of that made him pause and try to penetrate the secrets of the Soul's operations in the rational mind and through it in the senses.

This was Swedenborg's starting point in his pursuit of a more thoroughgoing knowledge of the Soul. He turned aside for the moment to work out his purpose to explore the kingdom of nature in its furthest recesses, in its invisibles and its beginnings. But after this excursion into the depths of nature, he returned to the pursuit of the Soul with an all the more determined purpose and with a zeal which enveloped his whole being, and directed all his scientific and philosophi-

cal energies. We see then that Swedenborg here came to a parting of the ways: the one led to the unutterably tangled web of nature's inner structure; the other led up along the ladder of knowledge from the level of the senses to the highest intuitions of the Soul. But at this stage he persistently held to the view that these two paths were somehow intimately connected; and he strove with all his might to penetrate the mystery of that connection. It is his special thesis at this point that this connection, having been distorted by the Fall, needs to be re-established by means of experience, geometry, and the exercise of reason; by these means, a path from the sense-organs to the Soul is remade.

By observation and experiment, by the use of our senses, we acquire a knowledge of the facts of the world of nature; in this way the body of scientific fact has accumulated through the ages, and Swedenborg thought that the time had come to make use of this store for a deeper investigation into the operations of nature. By such exercise, training, and development of the sense-organs and the sense mind experience is acquired; thus were opened and prepared the lower levels of the path to the Soul.

But such experience is only preliminary. With the senses alone, we cannot penetrate the realm of the invisibles. We must pass from the realm of sense objects to the realm of the finer mechanics, to the mechanics of invisible particles. Here we come to the simple universal properties of bodies, namely, figure, size, motion, direction, proportion, arrangement, behavior, etc. The fit instrument for dealing with these properties, which are in the last analysis position and change of position, is geometry; geometry, then, is the appropriate means for the further advance of the knowledge of nature.

Experience alone, knowledge acquired merely by the exercise of the senses, does not give us wisdom, especially that deeper wisdom of nature; for wisdom is what the Soul seeks, a knowledge of first principles and causes according to Aristotle. But the pathway from the senses to the Soul leads through the rational mind. Even in mechanics and geometry a highly developed faculty of perceiving relations comes into play;

the mechanics and geometry of invisible particles involve elaborate conceptual systems with a corresponding web of abstract relations. The perception of these geometrical and mechanical relations is in part the function of the rational mind, but it is a higher function of the rational mind to perceive the relations of means to end, of principles to the particulars developed from them, of causes to effects. This body of rational activity completes the pathway to the Soul, and is the indispensable, omnipresent, and most exalted means of acquiring wisdom. It is the Soul itself, however, that perceives directly the ends, principles, and causes; and, indeed, constitutes them.

This, then, is the ladder by which knowledge ascends from level to level of the Soul's operations; it is also the ladder by which the Soul descends from its intuition of ends to the bodily senses. It was characteristic of Swedenborg's view that the order of nature presented a corresponding ladder, extending from the First Natural point and the First Finite through successive composition and recomposition down to the "elements" and to the bodies of animals, plants, and rocks, bodies perceived by our unaided senses. The constitution of man repeats this order of nature, and there is a correlation, and a certain degree of consubstantiality, of the elements in nature and those in man's psycho-physical constitution.

It is this correlation, and identity of substance, which furnishes the basis, at this stage, of Swedenborg's theory of knowledge. In a word, man by virtue of his constitution is participant of nature in such a way that all the activities of nature, especially of elemental nature, are transmitted through his organism to his Soul. The illustration which Swedenborg himself uses is the spider's web. The web is so constructed that the spider at the center can feel and locate every touch anywhere throughout the web; so the Soul, when its connection with the body is fully established by due exercise and training of the intermediary organs and functions, is at once and spontaneously aware of everything that happens in the world of nature from its inmosts to its outmosts.

This then is the wisdom which the Soul seeks, and these are the means by which the wisdom is acquired. The events

are throughout mechanical events, and the means of transmission are mechanical processes, which have their basis and origin in the mechanical world of invisible particles. The bodies of nature and the organs of man's psycho-physical system are ultimately reducible to exceedingly minute particles, and it is the kinship, correlation, and co-adaptation of these two systems of particles that makes knowledge possible, which enables the Soul to receive messages from the remotest interiors of nature's processes. This theory of the parallel constitution of man and nature, and the consequent theory of knowledge is the chief burden of this first chapter of the *Principia*, and explains why Swedenborg goes to such length to discuss the means by which the wisdom of nature is acquired; and it furnishes us the key to that most significant contrast, between perverted man and man in his integrity, with which this chapter closes. Man by the abuse of freedom and the consequent abuse of all his faculties so disrupted the orderly connection between the higher and lower functions of his organism, that there is no longer an unimpeded transmission of nature's movements through the senses and the two minds to the Soul. This broken connection has to be re-established by the education acquired through the use of experience, geometry, and faculty of reasoning. Through these means, man is restored to his state of integrity; and, as when fresh from the hands of his creator, his wisdom of nature is then spontaneous and complete. To quote: "In this man, we may conceive to have existed such a complete contiguity throughout the parts of his system, that every motion proceeding with a free course from his grosser parts or principles could arrive, through an uninterrupted connection, at his most subtile active substance, there being nothing in the way to cause the least obstruction."

Here we have another of those extraordinary anticipations of modern scientific theory and investigation which are so frequent in Swedenborg's works.

The following quotations read like a page from the latest and most advanced treatise on Biology. In short they set forth the theory that two forces, the forces of nature from

without and the operation of the Soul from within, meet and co-operate in the formation of man's psycho-physical system. For example, the impinging ether waves co-operated in the formation of the eye; the air waves, in the formation of the organ of hearing; the effluvia carried in the atmosphere, in the formation of the mechanism of smell. Here is what he has to say about such formation: "When, therefore, the most subtile active principle of man, by the Providence of God, clothed itself with a body, and added by degrees parts upon parts, all the motions of the most subtile elements [from the outside] which were present would necessarily move that most yielding and tender substance, and would gradually impress themselves and their own mechanism upon it; so also would the motions in even the grosser elements, such as the air; for the air, . . . continually acting upon the same substance, would form something similar to itself, and by its constant motion cause itself to be received within, along with the rest. . . . In a word, during the growth of these very tender moving and living parts, every continuously present motion would of necessity leave vestiges of itself, and consequently form naturally a mechanism of its own; so that it would be received in the further stages just as in the tender substances. The man thus formed, in whom all the parts conspired to receive the motions of all the elements, and to convey them successively when received, through a contiguous medium, to the most subtile active principle, must be deemed the most perfect and the first of all men, being one in whom the connection of ends and means is continuous. Such a most perfect material and active being would in a short time acquire by the aid of the senses alone all the philosophy and experimental science natural to him; for whatever could present itself to his senses would flow immediately by connection and contiguity to his most simple and active first principle. . . .

"As, therefore, the whole man was constructed according to the motions of the elements, and those motions were capable of arriving without interruption through such a contiguous and tense medium at the most subtile active principle; what conclusion can we draw but that such a man must have enjoyed

the most complete, perfect, and distinct faculty of reasoning; that all the mundane system or the motions of the elements must have been familiar to him after a little contemplation and custom; that every relation of their motions, being impressed upon all his organs as it were naturally and from his tender infancy, would be felt with perfect regularity from his external parts to his Soul; and that the Soul, being furnished with such a body, would naturally be so well acquainted with geometry, mechanics, and the mundane system, as to be able to instruct herself without a master from the simple contemplation of the phenomena of nature and the objects of sense. Such a man would be capable of taking his station as it were at the center; and surveying from thence the whole circumference of his system at a glance, he would be able to make himself acquainted with things present, past, and future, from a knowledge of their causes and their given or supposed contingents”.

This passage is a fine specimen of Swedenborg's generalizing interest and power; it also reminds us of what the biologists say about the effect of light falling upon a sensitive spot of a protoplasmic mass in forming the eye. So far, we have physical and physiological mechanism, but here and there throughout the discussion we come to that inevitable borderland between mechanism and consciousness. It seems often that Swedenborg for considerable stretches does in effort as well as in fact identify knowledge and mechanism; and when he speaks of the Soul by preference as that most subtle active first principle, he is evidently trying to conceive the Soul itself as a mechanism; and he seems at this stage to have been so given to this view that after completing the *Principia* and his studies in natural philosophy he came back to the problem and wrote the book on *The Infinite* containing the essay on the *Mechanism of the Operation of Soul and Body*, where he made a concentrated and systematic effort to interpret this operation on mechanical principles, and to treat the Soul as a mechanism.

We have seen that, in approaching the actual working out of his theory of the physical world, Swedenborg encountered two philosophical problems of the very first importance, the

nexus between the infinite and the finite, and the problem of knowledge. In the work on the Infinite, he returned to the attack on both of these problems. The problem of knowledge involved directly the relation between the Soul and body. This raised the question as to the nature of the Soul, and in this essay Swedenborg made an elaborate attempt to answer this question by means of a knowledge of the mechanism by which the Soul operates in the body. But the result was unsatisfactory, and he came to the conclusion with genuine scientific and intellectual self-possession that he must investigate more thoroughly the complete mechanism of the body. The conclusion is stated in the following words: "We have no reason to despair of arriving at a knowledge of the Soul, . . . if the mind . . . examines all the facts with which experience supplies it; that is to say, the anatomy of the human body, of all its parts and their parts, and of all the organs existing both in the brain and in the body throughout; of all the organs of the external senses; all the modes and faculties that can be known or distinguished whether in imagination, memory, perception, or will; also the varieties and differences of all, arising from affections and other causes the most diverse; with many other subjects which require to be thoroughly scrutinized and compared in the most special manner. By these means we shall at last be enabled to arrive at sure conclusions respecting the true *geometry* and *mechanism* of this most perfect entity. And if it pleases God to accord me life and leisure, it is my intention to show in detail at what stage of the enquiry I have myself arrived. At present, I may observe in general that I do not think it prudent to make any affirmative or positive declaration on the subject".

This then is the result of Swedenborg's efforts to reach a knowledge of the Soul at this stage. His intention to pursue the quest further was carried out in the studies which produced those monumental volumes on the animal kingdom, especially in the chapter on the Soul in the *Economy of the Animal Kingdom* and in the *Rational Psychology*. But these studies and results belong to the middle period, in which he was being prepared for that doctrine of the Soul, based upon his actual acquaintance with Souls in the spiritual world.

In the meantime, we must not fail to notice that Swedenborg, in spite of his prepossession with the mechanical ideal, does as a matter of fact pause at one point to express very deliberately his appreciation of the contrast between mechanism and consciousness, and to assert positively and definitely that there are things in the world "which are not mechanical, nor even geometrical"; and he goes on to specify at least four, namely, the Infinite, the intelligent principle, Providence, and Love. What he says here about intelligence is especially pertinent to this discussion. He says in substance, that we may know the complete mechanism of the bodily organs; the eye, for example, and the nerve tract and the brain center, and all the changes that occur when the motion of the ether is transmitted to and is received by that most subtle active principle which is the Soul; and that it does not give its response until choice has determined its action in accordance with the will; we also see every motion and mode of the Soul performed mechanically in the body; but what that intelligence itself is which is in the Soul, which knows and is able to determine, to choose, and to let one thing pass out into act and not another, we obviously do not know. For it does not consist merely in the relation and reaction of motion proceeding from grosser through more subtle mediums to that nest of active principles where perception takes place. There are, then, qualities in the Soul which are very remote from mechanical apprehension. Since, now, the intelligence in the Soul is not mechanical, but only the mode in which the Soul operates, the question is what is the nature of that in the Soul which is not mechanical. In other words what is its rational and intelligent principle? First, we must say that it does not consist in knowing the many objects of the senses, nor the figures and spaces of geometry and their relations; for this is mechanics. But the rational principle does consist in knowing how to arrange the facts of the world in such order and connection as to bring to light their analogy. A higher rationality derived from this draws from the analogy so established a third or fourth level of truth before unknown. A still higher rationality consists in perceiving the relations

of means to the end in view. In short the principle of rationality in the Soul is the power of continual analysis of the objects of knowledge, or as he says "the continual analysis of those things which similarly inhere scientifically in its organs."

We have here as the deepest insight of this period, the characteristic distinction between rational intelligence, the Soul, and the body. The special problem and puzzle of Swedenborg's doctrine of the Soul, as the discussion is continued in the *Economy of the Animal Kingdom* and the *Rational Psychology*, is to make and to maintain the distinction between intelligence and the Soul. It must be said that, for this early doctrine, the Soul, as intermediate between intelligence and the body, occupies an equivocal position with respect to mechanism on the one hand and consciousness on the other. In this position and function, the Soul is often represented as knowing, but more often as receiving and reacting to the incoming motions through the organs of the body from the elements of the outer world of nature. To speak in the language of present-day psycho-physics, it is the return station of the "Reflex Arc," in terms of which modern behaviorists interpret the whole body of man's activities. It is this insight into and anticipation of the function of the reflex arc that constitute Swedenborg's early doctrine of the Soul one of the distinct and most significant epochs in the history of psycho-physics. Swedenborg, however, was as far as possible from being a mere behaviorist. In spite of much language that coincides with behavioristic usage, the distinction which he made and endeavored to maintain between the Soul as returning station of the reflex arc, and the Soul as intelligence, lifted his mind clearly above physiological series and operations into the field of consciousness. The distinction grew more and more pronounced throughout the later stage of the doctrine, that of the *Economy of the Animal Kingdom* and the *Rational Psychology*. It is, nevertheless, a matter of constant importance that the close reader should appreciate the persistent difficulty Swedenborg had in maintaining this distinction both in language and in thought; in fact it is the main problem

of the student of this doctrine throughout all its stages to follow, to bring to light, and to interpret, just these difficulties. And one purpose of this address is to direct attention to this problem and to stimulate others to undertake the task more exhaustively and more systematically.

It will be seen from the above discussion that this early doctrine culminates in the theory of knowledge which is exemplified by the picture of man in his integrity. And this vision Swedenborg preserved to the end.

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

TRUTH, GOOD, FELICITY.

ANDR. RYDELIUS.

To the will, pertains not truth but good. To the intellect pertains not good but truth; but here I define will as being inclination and determination together [*Förnufts Ofningar*, P. III, C. 6, Reg. V., p. 118].

Truth and good must by no means be confounded with each other; for when we desire anything as a good, we wish to persuade ourselves, as the will frequently does persuade the intellect, that it is true; . . . as, for instance, the avaricious man, who believes that what is useful is honorable, because he esteems it to be the highest good, and also wishes it to be true. . . . It is from this that all heresies draw their origin. The truth is often represented [in the rational], but the will does not give its approval. . . . A cold inclination to affirm what is true must be distinguished from a pathetic inclination to embrace what is good. . . . We must therefore search [the will and see] what is the ruling and dominant thing in us [*ibid.*, p. 118, 119, 120, 121].

Good is threefold, the Decorous, the Useful and the Necessary. Prudence without wisdom takes on the decorous, and the partly useful; but wisdom takes on the necessary [*ibid.*, C. 7, p. 141].

Reason does not represent good and evil before us so actively as does sense [*ibid.*, p. 139].

Good is manifold, such as political, economic, private [*ibid.*, P. v, C. iv, p. 410].

AUGUSTINE.

If the images of sensible objects are false images which cannot be distinguished from the actual senses; and nothing can be perceived except what is distinguished from the false; then no judgment of truth can be established in the senses† (*Octog. Quaest.*, Q. I, ix [iv, 205E]).

Everything lacking from that which is, lacks being, and tends to non-being. Being, lacking in nothing, is good; and lacking, is evil. But He to whom non-being does not pertain, is not the cause of the lack, that is, of the tendency to non-being; because He is the cause of being, if I may so put it; therefore He is the cause only of good, and for this reason is Himself the highest good (*ibid.*, Q. xxi [p. 206BC]).

The end of good, is that for the sake of which all other things are to be appetized, while itself is to be appetized for its own sake; and the end of evil, is that for the sake of which all other things are to be shunned, while itself is to be shunned for its own sake. . . . These ends therefore are the supreme good and the supreme evil. . . . MARCUS VARRO, in his book *De Philosophia** subtly and discriminatingly notes 288 sects, or various opinions which might exist, concerning the ends of good and evil. . . . Man has no other reason for philosophizing than that he may be blessed; but what makes him blessed is itself the end of good (*De Civit. Dei*, L. XIX, C. i, and II, iii [V, 225EF, 226C]).

† Augustine's argument is: The objects of the senses, being mutable, furnish no basis for sound judgment. Imaginations are false images which cannot be distinguished from the actual objects present before the senses. Nothing can be perceived which cannot be distinguished from what is false. Thus the judgment of

truth cannot be set up in the senses. Therefore we must avert ourselves from the world which is corporeal and sensible, and turn to God, that is, to truth which is grasped by the intellect and interior mind, which has no image of the false.

* Not now extant.

What the opinions of Christians are, concerning the supreme good and the supreme evil, as against the philosophers, who held that the supreme good in itself is their own possession. (*ibid.*, C. iv [*ib.*, 227F]).

Concerning the blessedness of eternal peace, in which lies the end, that is, the true perfection of the saints* (*De Civit. Dei*, L. XIX, C. xi [*ib.*, 231A]).

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ARISTOTLE.

Truth or falsity is a complex of the conceptions of the mind. . . . They do not exist without phantasms† (*De Anima*, III, ix [II, 53E; Bek., C. viii, 432a]).

We note that thought, phantasy, choice, will and cupidity are what move an animal. And all these are referable to the mind and appetite. . . . Not everything thinkable is choosable, but only the end contemplated in the things to be done. Therefore among goods, that which moves, is of such a nature; but not everything beautiful. For it moves only so far as something else exists for its sake, and so far as it is the end of the things which exist for the sake of that something. We must assume that a seeming good may take the place of good; and what is delightful sometimes appears to be good. . . . The eternally beautiful and that which is truly and primarily good,—and not at one time good and at another not good,—is too divine and honorable for anything to be prior to it. Therefore, that which is first and immovable, is what moves; while appetite is what moves the things moved (*De Animal. Motione*, vi [II, 116-7]).

The beginning of movement is that which is the object of pursuit or avoidance in the field of action. Heat and cold necessarily follow the thought and imagination of heat and cold; what is painful will be avoided, what is pleasant will be pursued (*De Animal. Motione*, C. viii [II, 119B]).

It seems not unreasonable that men have formed their conception of good and happiness‡ from various kinds of lives.

* The last two paragraphs are chapter-headings.

† *I.e.*, imaginative appearances or ideas.

‡ The word translated "happiness" and "happy" in these passages from Aristotle, involves the idea of blessedness.

The vulgar and the most useless and stupid of men have conceived of it as being pleasure. [Thus they embrace a life which is spent wholly in the enjoyment of pleasures. For there are three kinds of life especially conspicuous. The first, being that which we have mentioned, the second, the civil life, and the third that which is passed in contemplation and learning]. . . . The mass of men are more like slaves, preferring the life of brute beasts to all others. . . . Statesmen think happiness consists in honor. . . . The third kind of life is that which is spent in contemplation and learning. . . . That kind of life which is occupied with the care of money-making is exceedingly laborious and anything but living. Certainly the good which we seek, does not lie in riches; for riches must be sought for the sake of something else (*De Moribus* [Nichom. Ethics], I, iii [III, 4E, 5ABDE]).

Good is predicated of substance, and of quality, and of the relation of a thing to something else. Thus Aristotle contends against Plato, that happiness does not lie in the latter's theory of ideas; and that an idea is not the supreme good* (*De Moribus*, I, iv [III, 6AB]).

Is not good, that for the sake of which all other things are done? In medicine it is good health; in the art of commanding, victory. . . . In every action and planning, it is the end. . . . This must be the good which becomes action. The supreme good is seen to be a perfect something. . . . We may say that that which is to be sought after for its own sake, is more perfect than that which is sought after for the sake of something else. . . . The absolutely perfect is that which is always received and chosen for its own sake and never for another's. . . . That good which is in every way perfect seems, to be sufficient unto itself, . . . never desirous of any external thing. . . . The more a thing is good the more must it always be chosen. It is clear, therefore, that happiness is a perfect some-

* Aristotle is here speaking against Plato's doctrine that the idea of good is the supreme good. It is in this connection that he declares (as paraphrased by Du Val) "Plato is my friend but truth is a greater friend."

thing, sufficient unto itself, and accumulated from all goods; since it is the extreme of all those things which lie in action (*De Moribus*, L. I, C. v [III, 8DCDE, 9BC]).

Happiness is numbered among the goods of the soul (*animus*) and not among external goods. With this, agrees also the statement that the man who is happy lives well and does his work well. For happiness is usually defined as a good life, and good work (*De Moribus*, L. I, C. viii [III, 311D]).

To men studious of uprightness, those things are delightful which are delightful by nature; in which class come such actions as are in agreement with virtue. . . . Their life has no need of pleasure as a kind of appendage, but it contains pleasure within itself. . . . For a man is not good if he does not take delight in upright actions (*De Moribus*, L. I, C. ix [III, 12CD]).

If anything else is bestowed upon men by the gods, happiness certainly must also be a gift of the immortal gods; especially in view of the fact that it is the choicest of human things. . . . It is clear that if it be not sent as a gift of the immortal gods, but be the offspring of virtue, or of some doctrine or exercise, it must nevertheless be counted as among things most perfectly
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divine. . . . The reward and end of virtue is seen to be a thing most precious, being both divine and blessed (*De Moribus*, L. I, C. x [III, 13CD]).

That which is absolutely good, is also absolutely delightful; and such things are most highly lovable* (*De Moribus*, L. VIII, C. iv [III, 135D]).

It appears that an evil man is not of a friendly mind even to himself, for he has nothing lovable in himself. . . . Unrighteousness must be shunned with the most vehement effort, and service must be performed to all, in order that a man may be good. In this way he will be of a friendly mind to himself, and in a position to be a friend to other (*De Moribus*, L. IX, C. iv [III, 157D]).

* Aristotle is here treating of friendship which exists between friendship. He continues the passage as follows "and the love and such men, is the greatest and most precious of all friendship."

[If happiness is the action of virtue, it is reasonable to suppose that it is the action of that virtue which is the most excellent; and this must be the virtue of the best part in man.] Whether this be the mind, or something else which seems to rule and lead by natural right, and to contain in itself the notion of things noble and divine (whether it be itself divine, or be the most divine of the things that are in us*), it is the action of this part, in accordance with its own virtue, which will be perfect and complete happiness. It lies in the contemplation of things. . . . For of all the things that are within us, the mind is by far the best. . . . Wisdom seems to contain certain pleasures marvellous in their purity, and stability. . . . The wise man [is able to contemplate things when by himself; and this so much the more, as he is the wiser. Perhaps he would do it better if he had fellow workers; but nevertheless he] is the most self-sufficient of all men. And it would seem that that alone is happiness, which is loved for its own sake (*De Moribus*, L. X, C. vii [III, 180E, 181ABC]).

The man who is happy, since he is a man, will need also external prosperity. For his nature with its possessions is not sufficient for the work of contemplation; it needs also that the body be healthy, and that food and other services of life be supplied. . . . Solon not unfittingly declared that the happy are those who are moderately supplied with external goods [and have performed the noblest actions, and lived an upright life†]. . . . Anaxagoras also seems not to have esteemed a rich or powerful man happy [when he said that he would not be surprised if the man who is happy seemed to be an anomaly in the eyes of the world]. For the latter judges from things external, since these are all that it perceives. . . . He who performs works in harmony with the mind, and who cultivates the latter, and is mentally most well disposed, would seem to be the most beloved of God. For if the immortal gods have any care over human affairs, as seems most likely, then it is also probable that

* This statement is cited in 2 E. A. K. 250.

† In a footnote to his English translation of the *Nichomachean Ethics*, J. E. C. Weldon here suggests that Aristotle perhaps alludes to the story in Herodotus I, Ch. 30.

they are delighted with that which is the best of all, and is most nearly related to themselves,—and this must be the mind; and that they give rewards and show grace to those who have most highly cultivated this mind and held it in the highest esteem. . . . Therefore, a wise man is the most beloved of God; and it is probable that he is also most happy. Therefore in this way also a wise man will be the most happy of all (*De Moribus*, L. X, C. ix [III, 184D, 185ABCD]).

Good is the common element in all things. It is not, therefore, identical with that which can be separated; for that which by nature can be separated and can subsist by itself, cannot possibly be in all things. . . . The consideration of universal good is not the property of any one science or faculty; for good is found in all the categories (*Magnor. Moral.*, L. I, C. i [III, 193AE, 194A; Bek. 1182b, 1183a]).

Since the best good is happiness, and this is the end itself, therefore by living in action in accordance with the virtues, we shall be happy, and shall have the best good (*Magnor. Moral.*, L. I, C. iv [III, 198A]).

That a distinction must be made between those things in which a happy life consists, and those without which it cannot exist* (*Eudemior.*, L. I, C. ii [III, 259C]).

Entity is used in as many senses as good; for an entity signifies what a thing is, now as to quality, now as to quantity, now as to time (*Eudem.*, L. I, C. viii [III, 266BC]).

The reason we do not find truths, lies not in the things but in ourselves. . . . Philosophy is rightly called the science of truth; for the end of speculative philosophy is truth, while the end of practical philosophy is action; [for even if they consider how things are, practical men] do not look at cause as it is in itself but as it is in its relation to something else. . . . That which causes posterior truths to be true is itself most true. Therefore the principles of things ever existent, must necessarily be most true. [For they are not merely sometimes true; nor is any other thing the cause of their being, but they themselves are the cause of the being of all other things.] There-

* This is a part of the chapter translator of Aristotle's *Eudemia*. heading supplied by the Latin

fore, as each thing is circumstanced in respect to *esse*, so also must it be circumstanced in respect to truth (*Metaph.*, L. II,* C. i [*fin.*]).

ARISTOTLE on *Divine Wisdom according to the Egyptians*.

The sole principle of all things, is that which is the first and the true, namely, God, the Founder of both worlds. This is said by Plato, who adds, that the first active of this principle, is the supremely good; and that from it can come no other good which is good of itself; but whatsoever goods exist, it is by virtue of it that they are good (L. I, C. vi [IV, 606DA]).

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PLATO.

The accusation of the Athenians against Socrates whom Plato defended, namely: Socrates, being more curious than is right and proper, searches into things under the earth and in heaven; by his discourse he makes the worse appear the better cause; and he teaches the same also to others (*Apolog.* [*Socrates*], p. 19[B, vol. I; 1 Bohn 5]).

That felicity is the supreme good, is acknowledged by all men even the lowly and obscure (*Euthydemus*, p. 279[C, vol. I; 3 Bohn, 62]). That wisdom is felicity is clear and well known even to a child (*ibid.*). Wisdom causes men to act prosperously; for wisdom (that is, the real and certain knowledge of a thing) never errs or sins, but necessarily acts in a happy manner and pursues the end" (p. 280[A]).

It is an old proverb that things which are beautiful, are difficult [to learn] (*Cratylus*, p. 384[B, vol. I; 3 Bohn, 284]). The man who is wholly consumed with the desire of learning truth, and devotes all his labor to this one object, must necessarily comprehend things immortal and divine, if he would attain to truth; and so far as human nature can follow immortality, to that extent will he become profoundly immortal, losing no part of immortality; and since he ever cultivates the divine, and has a most precious god (*daemon*) in himself as familiar, he will be exceeding happy (*Timaeus*, p. 90[BC, vol. III; 2 Bohn, 406]).

* Sometimes printed as Book I the less.

If one is so occupied in the learning of things divine, that he has a mind content with his lot, subordinates human affairs, and with evenness of mind reaches, as by some favorable current, to a moderate and temperate life,—such a man has certainly entered upon the way of sure happiness; and truly, he to whom God has assigned such fortunes, is led to the happiest life, by means of opinion the most true (*De Anima Mundi*, p. 104[C, vol. III; 6 Bohn, 167]).

In each one of us there are two forms or species* which have the supreme authority and power of ruling [and which consequently lead us, and which we follow whithersoever they lead]. The one is the innate desire of pleasures; the other is acquired opinion which seeks what is good. These two are sometimes consentient in us, sometimes dissentient and tumultuous; and sometimes the one prevails and sometimes the other. When therefore, opinion, under the auspices of reason, leads to that which is best, and obtains the dominion, the mode of life is called temperance. But when cupidity without reason draws us on to pleasures and dominates us, the dominion is called lust or excess (*Phaedrus*, p. 237[E], 238[A, vol. III; 1 Bohn, 312]). So great is the force and efficacy of truth, that he who knows it, though he acts otherwise and even in jest, allures the minds of his hearers and leads them astray† (p. 262[D, vol. III; 1 Bohn, 340]).

Felicity is a good composed of all goods; a self-sufficing faculty for living well; a perfection in accordance with virtue; a self-sufficing usefulness of life (*Definit.*, p. 412[D, vol. III; 6 Bohn, 129]). Good is that which is, for its own sake (p. 413[A, vol. III; 6 Bohn, 130]). Good is the cause of safety to existing things; the cause of everything that has reference to itself; that on which depends the choice of those things that are suitable (p. 414[E, vol. III; 6 Bohn, 138]).

* A more literal translation of the original Greek would be: "two ideas". In Bohn the translation is "two principles".

† The Latin, here translated, is a very loose paraphrase of Soc-

rates' words as reported by Plato. A literal translation of the Greek would be: "One who knows the truth, jesting in his words, may lead his hearers astray."

None but God can be assigned as the cause of good things. Different are the causes of evil things; these must be investigated; but in no way can God be thought of, as the author of evil (*De Rep.* ii [C. xviii], p. 379[CD, vol. II; 2 Bohn, p. 60]). No change can come to God* ([Ch. XIX] p. 381[B, vol. II; 2 Bohn, p. 63]). He remains ever the same One, and absolutely in His own form† ([Ch. XX] *ibid.* [C]). In the whole compass of things cognizable, the last thing is the idea of supreme good,—an idea which can hardly be seen at all (Lib. VII [C. iii], p. 317[C, vol. II; 2 Bohn, 205]).

The motion and impetus which tends toward good, comes from the best soul; while the motion toward contrary things comes from a contrary soul. But it is necessary that evils have been vanquished and shall still be vanquished by goods. All these things are said by us, as against wickedness, if in any way it can be restrained and mended‡ (*Epinomis* [C. x], p. 988[E, vol. II; 6 Bohn, 29–30]). There should be not the least doubt, but that a good man must be called a wise man (*ibid.* [C. xi], p. 988[E; 6 Bohn, 30]).

MALEBRANCHE—*De Veritate*.

It is almost the same with the knowledge of truth as with the love of good; we enjoy the knowledge of truth, not unlike as we enjoy the possession of good, by a natural impression (L. I, C. i [p. 7; 1 Eng., 9]).

There is no good, about which the mind does not hang in doubt as to whether to love it or shun it. . . . Truth is nothing else than a certain harmony between two or more things; but goodness consists in the harmony whereby things are agreeable to ourselves. Hence it is, that in respect of truth, when the

* Here again the Latin translator has made a free paraphrase. Literally rendered the Greek would read: "Least of all could God have many forms."

† A literal translation of the Greek passage from which this is taken, reads: It is impossible for a god to desire to change him-

self; but each being most beautiful and excellent, continues to the utmost of his power ever absolutely in his own form.

‡ Literally translated, the Greek reads: All these things have been said by us with reference to justice, the punisher of the wicked.

analogy between certain things is represented, there is only one action of the will, namely, its approbation or assent. . . . It should be noted, that we tend toward truth and good by a natural motion; but when the will is carried only into things of which the understanding has some knowledge, it must necessarily be carried into that which has the appearance of good and
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truth. . . . Never give full assent to propositions unless they are so evidently true, that you cannot deny them without some internal torment, and the tacit reproach of the reason. . . . If you can abstain from the love of a good without anxiety of conscience, do not love that good absolutely. . . . It very rarely happens that truth entirely agrees with probability. . . . We can and ought to give assent to things probable, so far, namely, as they present an image of truth; but it should not be full assent (L. I, C. ii [p. 8, 9, 10, 11; 1 Eng. 11, 12, 13, 14, 15]).

WOLFF [*Psychologia Rationalis*].

We see the truth of a proposition by its connection with other universal truths; and demonstration makes the connection evident (n. 446). Demonstration evidences universal truths with which some other truth is connected (n. 447). One and the same proposition is immediately connected with other and different universal truths (n. 448). We perceive the falsity of a proposition by its repugnance to some universal truth (n. 449). The falsity of a proposition is seen mediately by its connection with a false proposition, or with one that is repugnant to universal truths (n. 450). A rational entity* is one that is fitted by its essence and nature to perceive the connection of universal truths (n. 451, *Psychol. Ration.*). By a Theory we understand a complex of universal truths (n. 467). An entity endowed with supreme reason, is one that perceives the connection of all universal truths (n. 471).

[GROTIUS].

I consider that I must fight for the truth, only by the truth, and indeed by such truth as finds approval in my own mind;

*By a Rational Entity, Wolff with reason, a human being. means an entity or being endowed

for it would be vain for me to devote my labor to persuading others concerning things of which I am not myself first persuaded (*Grot. De Verit. Rel. Christi*. [L. I, § 1], p. 2*). The demonstration of truth contains in itself the refutation of error ([*ibid.*, L. IV, § 1] p. 258).

LEIBNITZ *Theodicea*.

Since divine felicity is the conflux of all perfections, and delectation is the sense of perfection, hence, as a consequence, the true felicity of the created mind consists in a sense of the divine felicity. . . . Therefore our felicity cannot be separated from God's love (Tom. iii; Epist. V. ad Hanschium, July, 1707 [p. 68-9]).†

God antecedently wills all good *in se*; consequently He wills the best as an end; He wills that which is indifferent, and sometimes physical evil, as a means; but He wills to permit moral evil, only as a condition without which the best cannot be obtained (n. 25). Perfection embraces not only the moral good and the physical good of intelligent creatures, but likewise that good which is only metaphysical, and which also has in view creatures devoid of reason [*Theodicea*] (n. 209). The continual possession of good fortune dulls the sense of the good with us, and greatly exasperates and embitters the evil (n. 261). That God made man good, and willed his happiness, see Gen. i, 27 [Eccles. vii], Deut. xxx, 19; Jerem. xxi, 8; Sirac‡ xv, 14, 15; Jac. i, 14; 2 Cor. iv, 4 (n. 277, 278). Baelius§ says: I have never found anyone who does not confess, that truth, when clearly recognized, necessitates (or rather determines,

*The pages refer to the edition published in Amsterdam 1662, which is the edition listed in the Catalog of Swedenborg's library. In the present case the original MS has the reference "p. 8" which we have altered to "p. 2". The passage does not occur on "p. 8" of any of the score or more editions which we have examined.

† The work referred to is: God. Guil. Leibnitii, *Espistolæ ad Diverfos* . . . primum divulgavit Christina Kortholtus, 4 tom. Lips. 1734-1742.

‡ In the English Apocrypha this book is called Ecclesiasticus.

§ In Resp. ad Provinc. C. 90, T. 2, p. 219.

unless he is speaking of moral necessity) the assent of the mind [which confirms it by experience]. In the schools it is constantly taught that as truth is the object of the intellect, so good is the object of the will; and that as the intellect can never affirm anything except what has first been set forth under the appearance of a truth, so the will can never love anything except what appears to itself to be good. . . . There are highly learned men who assert with urgent reasons, that the will always and necessarily follows the ultimate practical act of the intellect (n. 309).

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LEIBNITZ. *Causa Dei Adserta per Justitiam* [Ejus].

The truth of things situated outside us cannot be acknowledged except by a connection with phenomena (*Annotat. in Lib. de Orig. Mali.*, n. 5). As wisdom, or the knowledge of truth, is the perfection of the intellect, so goodness or the appetition of good is the perfection of the will. Every will indeed has good for its object,—at least apparent good; but not the divine will, which has no other object than good and truth together (*Causa Dei*, etc., n. 18). We must, therefore, regard both the will and its object, namely, the good and the evil, which supplies the reason for willing or not willing; but in the will itself, we must regard both its nature and its species (n. 19).

Truths of the reason are of two kinds. Some are called eternal truths; these are absolutely necessary, and thus their opposite involves a contradiction. Of this kind are such truths as have logical, metaphysical, or geometrical necessity, so that he who denies them can be reduced to absurdity. The other truths of the reason may be called positive, because they display the laws which it has pleased God to implant in nature, or at any rate depend on such laws. These we learn either by experience, that is, *a posteriori*, or by reason and *a priori*, that is to say, when from knowledge we bring out the harmony for the sake of which they were appointed (n. 2, *De Conform. Fidei cum Ratione*).

SCRIPT. SACRA.*

Whatsoever God hath founded, is good, nor is aught to be rejected, if it be received with thanksgiving. For it is sanctified by the Word of God and prayer (I Tim. iv, 4, 5). If God spared not the angels that sinned, but cast them down to Tartarus and delivered them in chains of darkness to be reserved for damnation—(2 Petr. ii, 4). Concerning the fall of the devils, see the Epistle of Jude, verse 6. [Concerning] the combat between Michael and the dragon, etc., [see] Apoc. xii, 7-11.

MALEBRANCHE—*De Veritate*.

Some truths are necessary, others are contingent. I call those truths necessary, that are immutable in their nature, and have been decreed by the unchangeable will of God; all others are contingent truths. Mathematics, physics, metaphysics, and morals, comprise for the most part, necessary truths; while history, grammar, the law or custom special to any locality . . . are contingent truths (L. I, C. iii [p. 14; 1 Eng. 20-1]).

[For Malebranche] on the error and fallacy of the sense, see above, p. 34, *seq.*

Those who apply themselves merely to things sensible and agreeable hardly ever give much sustained or serious work to the discovery of truths. . . . [Wise men] emulate the famous example of the judges of the Areopagus, who forbade the advocates to use deceitful words and fallacious figures; and would listen to causes only in a dark place, lest the charm of their words and gestures should cloak the truth, and hold them back from the real substance of the causes (L. I, C. xviii [p. 72; 1 Eng. 107, 108]).

[For the opinion of Malebranche] as to why there is a propensity to good, see *God*, p. 124, above.

The love of good in general is the principle of all our special loves, since that love is really nothing but our will itself. For man's will is nothing else than the continual impression of the Author of nature which carries the human mind towards good in general (L. IV, C. i [p. 242; 1 Eng. 4]).

* From the Latin translation by Beza.

If the mind could easily apply itself to clear and distinct ideas without the aid as it were of any sensation;* and if the restlessness of the will did not continually disturb its application; then truly we would be able without any difficulty, to solve innumerable physical (or natural) questions which we regard as inexplicable; and in this way would soon be able to escape from the ignorance and error in which we labor in regard to these questions (L. IV, C. ii [p. 251; 1a Eng. 17]).

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DISTINCTIO.

[ANDR. RYDELIUS].

He who has not learned how to make clear distinctions, or who does not perceive things distinctly, and first concerning himself, easily falls into scepticism, so that he believes nothing (Andr. Rydelius [*Förnufts Ofnningar*, P. III, C. 6, Reg. 6, p. 135]).

TRUTH, GOOD, FELICITY.

[MALEBRANCHE—*De Veritate*].

The mind rests peacefully when she receives evidence, but is troubled when she finds it not. For evidence is the criterion of truth. . . . Hence come the heresies of religion; for [heretics doubt whether the truth is to be found in the decisions of the church, because they see therein no evidence; and because] they promise themselves that with evidence, they can learn the truths of faith (L. IV, C. iii [p. 256; 1a Eng. 23]). Truth is not discerned except when things are seen as they are in themselves; nor are they ever seen as they are in themselves, unless they are seen in that which embraces all things in itself in an intelligible way. When we see things in ourselves we see them only imperfectly, or rather, we see nothing but our own sensations,† and not the things which we desire to see, and which we falsely believe we really do see (L. IV, C. xi [p. 289; 1a Eng. 67–8]). They who desire to approach truth that they

* According to the original French, the translation here should be "without being buoyed up as it were by any sentiment

or opinion" (sans être comme soutenu par quelque sentiment).

† The French is *sentiments*, i.e., sentiments, opinions.

may enjoy her light, must start with the privation of pleasure. They ought sedulously to avoid all those things which vividly affect the mind, and pleasantly occupy and distract it. The senses and affections should be silent, that the voice of truth may be heard. Indeed, withdrawal from the company of men, and contempt of all their sensible things, is necessary both for the perfection of the mind and for the conversion of the heart. . . . If it were possible that we could be wholly delivered from pleasures and sensations, then we would be able to pursue truths the most abstract and difficult of all; indeed, the more we recede from those things which are not God, the more do we approach to God; the more we avoid error, the more quickly do we discover truth (L. IV, C. xi [p. 290; 1a Eng. 68-9]). Truth is nothing else than a real relation either of equality or of inequality. Falsity is nothing else than a negation of truth, or a false or imaginary relation. Truth is that which is; falsity is non-being, or, if you prefer, is that which is not. When we see relations which truly exist, we are never deceived, since we are never deceived when we see the truth. But when we judge that we see certain relations, which yet do not exist, then we are deceived; for then we see a falsity, we see that which is not, or rather, we see nothing (L. VI, Pt. I, C. v [p. 405; 2 Eng. 163]). Truths therefore are nothing else than relations, and the knowledge of truths, is nothing else than the knowledge of relations (*ibid.* [p. 406]). Those truths that are among ideas, are eternal and immutable; and by reason of their immutability they are also the rules and measures of all other truths; for every rule, or measure must be immutable. . . . Only those truths that are among our ideas, and also the Supreme Entity, are immutable. . . . We seek to discover by the bare exercise of our mind, only those truths that are among ideas (L. VI, p. I, C. v [p. 406; 2 Eng. 164]).

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(To be Continued)

THE BRAIN.

BY EMANUEL SWEDENBORG.

Chapter VIII (*Continued*).

THE INTERNAL CAROTID AND VERTEBRAL ARTERIES.

321. 157. Having treated of the cavities and canaliculi of the venous blood, it is advisable that we now treat of the arteries also, in order that the continuous action of the cerebrum upon its blood, and of the blood upon the cerebrum, may be made clear. For when devoid of blood, the cerebrum is dissolved in sluggish ease, and the cortex and ash are then inert masses and molecules, to which the life of the soul does not reach. If the cerebrum is over-abundant with blood, its substance is incapable of action, and unable to fall into its alternations. Its arteries are the carotids and vertebrals, both external and internal.

322. The carotids originate deep down [in the thorax] from the aorta where it bends upwards in the form of a plough-handle; the right carotid usually arises from the subclavian artery. Each trunk mounts up freely by the side of the trachea and larynx, as a straight stem, almost without branches; and this lest it dispense its volatile contents elsewhere and deprive itself of that essence which it is bound to expend on the cortical substance and the fibres.

323. The INTERNAL CAROTID is diverted from the common trunk near the larynx, and enters the bony canal in the petrous apophysis* of the temporal bone which opens inwards midway between the great process of the occipital bone and the styloid process,† only a little space below the Eustachian tube; where also, between the apex of the petrous bone and the upper margin of the aperture, there is sometimes contained a little bone like a sesamoid. Girded with the dura mater as a covering, and, according to some, with the periosteum of the head, this artery, laying aside its muscular coat, enters the cranium by the side of the posterior clinoid processes of the sella equina, and at once advances to the anterior clinoid processes; and emerging from

* Or process.

† That is, between the basilar and styloid processes.

the cavernous sinus of these processes, through a foramen, disperses itself through the cerebrum and into the cerebrum.

324. Its passage through the canal, which in a way is horizontal, is almost angularly serpentine. Its exit from the canal towards the base of the sphenoid bone near the clinoid apophyses is curved. Its passage through the receptacles* of the sella of the bone is variously inflected and tortuous. Its egress from the receptacles towards the infundibulum is sinuous. Here it approaches nearer to the carotid of the other side, and, in not a few cases, communicates therewith by a short, transverse arterial line. It then divides, and expands into two or three threads,† one of which, departing from the other carotid, stretches in a forward direction, and after describing a hemicycle between the olfactory nerves, to which it also sends out offshoots, again approaches its deserted carotid in the manner of a comrade, and by a short anastomosis,‡ is again united with it. Then they each again separate into branches, one of which seeks the anterior lobe of the cerebrum, distinguishing it from the posterior, and then splits and furrows it. The other seeks what, by some, is called the middle lobe. This branch is also reflected around the anterior regions, and runs backwards over the dorsum of the corpus callosum; where, in some subjects, it is double or bifid. A third branch, which is either an associate or companion of the second, or else an independent branch, seeks the posterior

* The cavernous sinuses.

† Namely the anterior cerebral and the posterior communicating; or the anterior cerebral (the artery of the corpus callosum), the middle cerebrum (the artery of the fissure of Sylvius) and the posterior communicating. It appears from Winslow (n. 349) on whose description the account in the present text is based, that the middle cerebral artery is sometimes the middle of the three main divisions into which the internal carotid separates (presenting the ap-

pearance of a stem and tripod) and sometimes a branch of the anterior cerebral artery (*cf.* Willis, 329). It is the latter of these cases that is contemplated in the present text. Winslow says that the middle cerebral artery comes off from the anterior cerebral *after* the latter has sent the anterior communicating artery to its fellow of the other side; but this is contradicted by Willis (n. 330).

‡ The anterior communicating artery which constitutes a part of the circle of Willis.

lobe.* Thus then, by means of the underlying pia water, they are everywhere present in the substance of the cortex. The two remaining threads ramify in a like manner, and almost in capillary form are distributed to the pia mater, with which they are tunicated, presenting an effigy of creeping ivy and sanguineous foliage; nor are they lost until they come to the cortex or interior substance of the cerebrum.

325. It is also worthy of attention that the carotids† pass almost around the region of the optic nerves, where those nerves decussate, and the region of the infundibulum; and that upwards, especially in the front part, they divide the surface of the cerebrum into quasi peninsulas, which, with their gaping prominences, are conspicuously apparent.

326. In connection with the entrance of this artery, we have the notable fact that, through this same carotid foramen, the great intercostal nerve passes out of the cranium, or enters into it. In this passage and beyond, it is attached to the carotid by a species of cellular, filamentary, or quasi-membranous vagina, or a vagina of plexiform filaments, sinuously penetrating both its proper and its adscititious tunic. According to WINSLOW, these filaments, adhering to the artery, are "like tender shoots, of slight consistency, reddish, and sometimes mucilaginous" (*Expos. Anat.*, Tr. des Nerfs 368).

327. By the meninx in the sphenoidal cavernous sinuses, the artery also communicates with several nerves, which here, when about to leave the cerebrum, first salute each other, and then proceed separately to their own provinces. In the neck it also communicates with the highest ganglion of the same intercostal nerve, which, together with the nerve of the eighth pair, passes midway between the aforesaid artery and the jugular vein. Moreover, the carotid is incumbent on the dura mater, where the latter, like a window, shuts in, a certain blind foramen, not open outwards, between the sella equina and the petrous apophy-

* These three branches are further described by Winslow in n. 336.

† The reference seems to be to the posterior branches of the two

carotids (the posterior communicating arteries), as distinguished from the anterior, or the anterior and middle; see a preceding note.

sis; and from the cavernous receptacles it sometimes sends off to the same meninx a kind of reticular plexus, whence in some subjects there arises a rete mirabile.*

328. Meanwhile, not long after emerging from the obscure hiding-places of the sella equina, and while beginning to let themselves down between the lobes and towards the interior parts of the cerebrum for the formation of the choroid plexuses, the internal carotids associate themselves with the vertebral arteries, by means of an interjected branch;† that thus a passage may be open on both sides, from the united trunk of the vertebrals (which is also called the cervical or basilar artery) to the carotids, or from the carotids to the vertebrals. The authors' descriptions are as follows:

329. WILLIS—"The trunks of the carotid arteries, ascending upwards, are presently divided on both sides into an anterior and posterior branch. Each of these branches inclines towards its fellow of the other side, and the two are mutually conjoined; moreover, the posterior branches thus joined together are united with the vertebral branches after the latter have coalesced into one trunk. For after emerging from the penultimate foramen‡ of the cranium, the vertebral arteries first proceed along the sides of the medulla oblongata separated from each other; then, being united together in its base, they produce a single canal. This canal, meeting the posterior branches of the carotids, is conjoined with them, and from the place of their coalition, a signal branch§ rises up on either side under the edge of the cerebrum. After being carried over the crura of the medulla oblongata, this branch is split up into a large number of minute offshoots, like capillaries; some of which ascend to the little glands situated near the cerebellum, while the others constitute the arterial part of the choroid plexus."

330. Before the anterior branches of the carotids are united they send off on either side a signal branch,|| which, creeping upward like a boundary stream, distinguishes either hemisphere

* Cf. Willis, n. 331, 332.

§ The posterior cerebral artery.

† The posterior communicating artery.

|| The middle cerebral artery, or artery of the fissure of Sylvius.

‡ The foramen magnum.

into two provinces, as it were. After the aforesaid branches are united, they soon separate from each other and are carried to the prow of the cerebrum; and being there reflected, they go between its hemispheres and over the corpus callosum. Both before and after their mutual coalitions, all these arteries send off in all directions, propagations and little branches, like the runners of a vine, which wind through and intimately engird not only the outermost circuit of this sphere, but also its penetralia and interior recesses (*Anat. Cerebri*, Ch. I, pp. 13-15).

331. The carotid arteries of one side, are united with the carotids of the other in many places. Moreover, the vertebrales of both sides inosculate, both with each other, and with the posterior branches of the carotids, after these branches have united. In many animals, the anastomoses of the carotids are effected near the base of the cranium under the dura meninx, and this in different way. In some animals they are effected by the vessels of a rete mirabile, communicated from either side to the other; in others an arterial canal is produced between the trunks of the carotids, whereby the blood can be transferred from one side to the other, and vice versa. . . . Thus if by chance one or another of the passages be obstructed, another can yet easily be found to take its place. For instance: If the carotids of one side be obstructed, the vessels of the other side would provide for both provinces; and the same provision is also made in respect to the vertebral arteries. Furthermore, if the two carotids be stopped up, the offices of each are supplied by means of the vertebrales; and so, on the other hand, when the vertebrales are closed, the carotids supply the deficiency (*ibid.*, Ch. VII, pp. 92-4).

We quote Willis' experiment in proof of this position. "Whenever I injected a liquor stained with ink, into either of the carotids, the branches on both sides, nay, and also the main shoots of the vertebral arteries, were at once stained with the same tincture; indeed, when the injection was several times repeated through a single opening, the vessels that crept through every corner and recess of the cerebrum and cerebellum were imbued with the same color. Moreover, in subjects possessed of a rete mirabile, the tincture injected on one side, pervaded

the retiform plexuses of vessels on both sides (*ibid.*, p. 94). When I was dissecting the body of a man who had died from a large scirrhus, and finally ulcerous, growth within the mesentery, I found the right carotid, where it emerges within the cranium, quite bony, or rather stony, with its cavity almost entirely closed up; and since influx by this path was thus denied to the blood, I wondered that the patient had not earlier died of apoplexy,—a condition which was so far removed from him, that to the very last moment of his life he had the free use of his mind and animal function. But nature had substituted a remedy, to wit, on the side where the carotid was deficient, the vertebral artery, enlarged by a tubulous mass, was found to be three times as large as its pair on the other side. The blood excluded from the carotid artery, adding itself over and above the wonted provision conveyed by the vertebral, and flowing with it into the vertebral channel with a double flow, had in this way dilated the channel of the artery beyond its wont. About the beginning of his illness the patient had been tormented with an atrocious headache on the left side" (*ibid.*, Ch. VII, pp. 92-6).

332. Each carotid, while passing through the cuneiform bone, is thus curved and twisted in its ascent, to the end that before coming to the cerebrum, the blood, impeded by the repeated interposition of shores, or of a kind of bar, may flow thither more slowly and less rapidly. But this is not brought about in all animals by one and the same arrangement. For although in all animals the ascent of the artery is oblique and twisted, yet in some, to wit, in man and in the horse, it progresses all the way to the cerebrum, circumflexed into wider circles and with its trunk single and undivided. But in most other quadrupeds, it mounts to the cranium by a smaller circuit, and then, hiding under the dura mater, is at once split up into retiform plexuses, called rete mirabile. [Enquiring into the various reasons for this difference] we note first that in man the carotid artery enters the skull somewhat further back than in any other animal, namely, near that foramen through which the lateral sinus passes out from the cranium to enter into the jugular vein. In all other animals the artery emerges into the cranium under the extremity or acute process of the petrous bone; but in the human

head, after being led around over a longer course, it reaches the base of the skull near the cavity made by the entrance of the lateral sinus; and here, being at once twisted, it enters its own proper canal ensculptured in the cuneiform bone; and, moreover, for greater safety is invested with an additional and thicker tunic. . . . On leaving the bony canal, the artery lays aside this acquired tunic; and having now come within the cranium in good condition, it winds forward in a long tract by the side of the sella Turcica and under the dura mater, invested only with its own proper tunic; and after being pressed down in the middle of its passage, as though into a valley, it soon rises again, and proceeds on its way until it comes to the head of the sella Turcica; where, after being again curved and twisted in a kind of circle, it mounts straight up, and piercing the dura mater, is carried towards the cerebrum. . . . The nearest approach to the structure of the carotid, in man, is its conformation in the horse; for in this animal also the artery enters the cranium further back and with a larger circuit than in other quadrupeds; and after this, its trunk having been twisted in a kind of circle, and then slightly depressed, it proceeds to the side of the sella Turcica, intact and with its cavity still ample and open. . . .

333. Between the cavities of the two arteries, is formed a transverse canal, as a diverticulum . . .; and moreover, certain shoots sent out by the trunks of both arteries, are inserted into the pituitary gland. . . . In the sheep, calf, hog, dog, fox, cat and other quadrupeds, this artery is divaricated into retiform plexuses. . . . In those animals in which the rete mirabile is found, the artery when about to enter the cranium is not carried around by so long a circuit, but when it emerges at the posterior part of the sella Turcica, it is at once divided into delicate offshoots. . . . From the sides are derived many rivulets which go in every direction. These rivulets are partly ingrafted in the venous passages of the sella, and in the vessels of its other side; are partly carried into the pituitary gland; and, after describing a circuit, are partly returned to the former cavity of the artery. If an ink-colored liquor is gently and gradually injected into the trunk of the carotid below the cranium, this liquor, traversing the straight passage is at once carried to the cerebrum, and,

without infecting the lateral vessels of the plexus with its stain [But if the liquor is injected in sufficient quantity and with force, then, running straightway to the plexus,] it will blacken [both the vessels of the plexus, and those of the opposite side] and also the nearer side of the pituitary gland, and its interior structure into which it enters (*ibid.*, Ch. VIII, pp. 99-104).

334. See also the author's Table VII* in his *ANATOMIE CEREBRI*, fig. 1, where the curved ascent of the carotid is represented, showing that, when it ascends into the cranium, it is enclosed in an osseous canal, and goes under an additional tunic. Also [fig. 2 of the same plate] showing the ascent of the carotid in the horse, and the communication between the two carotids by a transverse branch; how each of them sends off shoots into a double trunk. His first table, and especially his second, shows how, in a sheep's brain,† the posterior branches of the carotids the pituitary gland, and is afterwards divided and ascends with are united at the place where they meet the trunk of the vertebral arteries; and how, after being separated, they surround, like banks, the whole area where is situated the pituitary gland and where the optic nerves coalesce; from which area, moreover, they send off sideways, a notable branch‡ to the middle of the bulbs of the olfactory nerves; and, furthermore how they come together above, between the above-mentioned nerves, and being again divided, are joined to each other by anastomoses, when they are finally reunited near the crista galli.

[The rest of the anatomical citations are omitted.]

336. Receding from their trunks, the anterior branches of the carotids, which are smaller than the posterior, coalesce together in the middle of the base of the cerebrum.

352. 160. The VERTEBRAL ARTERY is the second of the arteries that enter the cranial cavity; and mainly under its patron-

* This Table is properly VIIa, being an insert between Tables VI and VII.

† The first table shows a human brain; the second, a sheep's brain.

‡ The middle cerebral artery. The statement in the text applies

only to the sheep's brain, which, unlike the human, is not divided into lobes by a fissure (the Sylvian fissure). Here the middle cerebral artery is distributed to the base of the olfactory tract.

age do the cerebellum, and the medulla oblongata, and, within the vertebra of the neck, the medulla spinalis; perform their vital functions. This artery is likewise double. Emerging from the subclavian, a little beyond the place where the carotids take their exit, it rises upwards, girded, like the aorta, by the thymus gland. That it may proceed safely in a bony support, each artery enters into the foramina cut through the transverse appendages of the vertebrae of the neck; and after sending out branches here and there into the medulla of the spine, and its integuments and the neighboring muscles, it makes for the superior condyles by a steep path at their threshold. Here it makes two more geniculate bends; first around the second of the highest vertebrae of the neck, called the epistropheus,* then, backward around the first vertebra or the atlas, and outward again, forming a considerable lunar arc. After this it at once resumes its course. Having in this way sent off branches to the occiput and to the arteries both of the occiput and of the neck, it passes through the foramen magnum of the occiput at the place where the first nerves in the spine of the vertebrae, or the last in the cerebrum† pass out; and being then accommodated with a tunic from the dura mater, it bends itself toward the back part of the medulla oblongata by a short circle within the cranium, and afterwards, from both sides, coalesces into a little trunk called the *posterior spinal artery*.‡ Some of the offshoots arising

* The axis.

† The first cervical nerve, called by Willis and others the tenth or last pair of the head; by Ridley and later writers, the first of the spine, and by Winslow (Tr. de la Teste 147) the sub-occipital, first spinal, or tenth cerebral.

‡ The posterior spinal arises from the interior and posterior side of the vertebral artery and then curves backwards and upwards to the posterior region of the spine. After giving off branches, it then descends along the spinal marrow. According to Vieussens (n. 362)

whose description with the accompanying figure is followed in the present text, the two posterior spinals near their origin, merge into one, like the anterior spinals. But Vieussens' figure shows them as frequently dividing into two during their course. According to the modern anatomists we have consulted, they remain double throughout their course, though they frequently anastomose with each other and with the anterior spinal arteries. In the present text the posterior spinal at its origin is regarded as the posterior branch of

from it,* penetrate to the stem of the medulla oblongata, to its pyramidal and olivary bodies, and to the fourth ventricle and its choroid plexus; others have a wider sphere, penetrating to the cerebellum and its interior cortex on that side; and the blood which they do not expend, they send into the veins and thence into the fourth sinus; not to mention what this artery distributes to the dura mater lining the occipital and petrous bones.

353. The second or anterior branch of this artery, mounting from the basilar or sphenoidal apophysis of the occiput, first by a direct and then by an oblique and more gentle ascent, meets its fellow of the other side, which has made a like journey and which curves toward it; and after sending off shoots to the seventh, eighth, ninth, and tenth pairs of nerves, the two arteries coalesce into one trunk, called by some the cervical artery, and by others, the basilar. They come together almost at their first approach to the process of the cerebellum.† From the angle formed by the coalition, or from either leg thereof, and almost at the place where they are surrounded by the ninth pair of nerves, springs the *anterior spinal artery*; to the sides of which, in its descent, anteriorly, down the long stem of the medulla of the spine, come many rivulets.

354. The *cervical* or *basilar* artery, or the united vertebral, runs in a small channel, formed by fibres which here coalesce from both sides, along the length of the underlying pons Varolii, all the way to the slightly elevated roots of the infundibulum. It is straighter in human subjects and very short in the brains of sheep and other brute animals. It supplies blood to the annular protuberance which it crosses, or to its feeder, the cineritious substances. Above, however, it gives off shoots which are sent, some to the central space itself and the infundibulum, some to the beginnings of the third, fourth, fifth, seventh, and eighth pairs of nerves; others to the sides of the medulla oblongata;

the vertebral, for in the following paragraph, n. 353, we read "The second or anterior branch of this artery" (the vertebral), etc. In this our author follows Vieussens, who calls the posterior spinal the "inferior branch" of the vertebral,

and the vertebral proper, after it has given off the posterior spinal, the "superior branch"; see n. 362-3.

* That is, from the vertebral; see n. 362.

† The pons Varolii.

others to the posterior part of the larger ventricles; to the thalami of the optic nerves; and, in the ascent thither, to the pineal gland, the nates and testes, and also to the internal surface of the lymphaduct* and of the calamus scriptorius.

355. Two very prominent arches† reflected downwards from the common trunk towards the sides, and thence bent inwards, approach the choroid plexuses, extended through four ventricles; and in conjunction with the carotids they give birth to these plexuses as the offspring of three parents.‡ Insinuating themselves in like manner between the cerebrum and cerebellum, they provide for the pia mater of both, that is, for the pia mater on the posterior surface of the former and for that on the anterior surface of the latter.

356. Finally, by means of two elbows§ extended upwards from the common trunk, or from the above-mentioned superior arches, or sent downwards by the carotids, they conjoin themselves with the latter, and, surrounding the whole area of the infundibulum, enclose the latter like streams or banks with a common blood, and distinguish it from the neighboring parts. Moreover, in the angle of their divarication, the two arched branches of the cervical artery, mentioned above as the genitors of the choroid plexuses, embrace the their pair of nerves,|| at the point of their departure to the muscles of the eye.

[The anatomical citations that follow are omitted.]

371. 162. We may further add a few particulars concerning THE RAMIFICATIONS OF THESE ARTERIES THROUGH THE PIA MATER. But it is best to present the very words of the authors.

372. WILLIS. In like manner as the pia mater, investing the whole cerebrum and its parts, receives the arteries ascending from a fourfold fount, so also it everywhere abounds with veins sent out from four sinuses. These vessels meet each other, are

* The aqueduct of Sylvius.

† The posterior cerebral and the anterior or superior cerebellar arteries; see Ridley, n. 367.

‡ Prolem trimellam. This would be more naturally translated "triplet offspring," but the translation

made in the text is demanded by the sense, and is justified by classical precedent.

§ The posterior communicating arteries.

|| The oculomotor nerves.

mutually complicated, and by means of shoots drawn from the one and meeting the shoots of the other, are variously twisted together and almost everywhere constitute retiform plexuses; and not only do these plexuses exist externally in the surface, but in dissecting vascular plexuses of this kind, they are found wherever you try to separate one part from another without destroying the unity. Indeed, if you look at the brain when removed from the cranium, this membrane which binds together the tops of all the winding fissures and interstices, and covers them with a complication of vessels, will make the whole surface of the brain seem like a ball covered with a network of embroidery (*Anat. Cerebri*, Ch. I, p. 15). Furthermore, the pia meninx, although a delicate membrane, nevertheless throughout its whole extent, is so covered with plexuses of arteries and veins, and to some extent interwoven with them, that it irrigates all the spaces of the cerebrum and cerebellum with streams innumerable (*ibid.*, Ch. VII, p. 89).

373. With respect to the sanguiferous vessels that cover the pia mater, we observe that when the arteries and veins meet each other from opposite extremities, they not only transfer their burden directly by means of individual shoots mutually inosculated, as is usually the case in other parts of the body, but that, by various complications and interweavings, they everywhere set up wonderful plexuses, in which, for the most part, are inserted vast numbers of minute glands (*ibid.*, p. 96).

374. If you inject the carotid with a black liquor, then, in addition to the vascular shoots which the injection has everywhere tinged with its color, there will be seen black spots scattered about in the substance of the cerebrum. Furthermore, if the cerebrum of a living animal is dissected, lively blood will spring both from its cortex, and from its medullary portion (p. 97).

375. We also observe that these arteries and veins, unlike what obtains in every other part of the body, though not originating near each other, yet go together as companions; and proceeding from opposite ends, everywhere meet each other; that is to say, the arteries ascend from the base of the skull, and, creeping through the whole skull, send shoots and branches up-

wards, which are met by venous shoots arising from the sinuses and carried downwards. In this way the streams of blood in the cerebrum seem everywhere to be equilibrated,—the small shoots of the veins follow the greater branches of the arteries, and, on the other hand, the small branches of the arteries, the trunks of the veins. These vessels are also frequently inosculated and this in various ways, to wit, not only arteries with veins, but also arteries with arteries (p. 92).

376. VIEUSSENS. As regards blood vessels, the dura mater is irrigated by a greater number, but the pia mater is furnished with a more elegant equipment. For the latter supports both the veins emerging from the substance of the cerebrum, and also all the arteries that are inserted therein; and these vessels are divided into shoots, innumerable and most highly delicate, not to say insensible, which, almost everywhere, are twisted together in a marvellous way, and become retiform plexuses underlying the whole surface of the pia mater; plexuses which, though they generally escape the sight of the eye, are very conspicuous in persons who have been strangled, or who have died of madness (*Neurog.*, VI, p. 31; and in Manget, 2 *Bib. Anat.*, p. 131).

377. As to the manner in which these vessels run among the furrows and ridges, and at the same time obliquely across them, see Ridley's Table i., Vieussens' Tables ii, iii and v,* and Willis' Tables i and iii. In two of Bidloo's tables, and in two of Ruysch's,† it may be observed that while the arteries are inserted into the very furrows of the cerebrum, almost transversely, and also flow through the little circles of the cerebellum, the veins do not press into the furrows, but hasten obliquely over their tops towards the sinuses, and when they have associated themselves with other veins, insert themselves there with their united cavities in an oblique and curved direction; but a figure is more eloquent than a description, and more suitable to the comprehension of the understanding.

* In Manget, 2 *Bib. Anat.*, Tab. V, and table VIII, fig. 5; and LIX, fig. 2, LX, fig. 1, and LXI, Ruysch's Tables 10 and 13 appended to his ninth and twelfth fig. 1.

† The figures here referred to are in Bidloo's (or Cowper's) table epistles respectively.

(To be Continued)

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EDITORIAL NOTES.

WHY SAP RISES.

Sir Jagadis Chandra Bose, founder and director of the Research Institute in Calcutta which bears his name, and famous for his investigations into the physiology of plant-life, has recently made discoveries with regard to the hitherto unsolved problem as to what makes sap rise in plants. His article on the subject appeared in the *Manchester Guardian* of July 21, 1922, and was reprinted in *The Living Age* of Boston, August 26th, 1922.

To the New Churchman, familiar with the doctrine that the brain animates from its unit cells to its peripheries, Sir J. C. Bose's conclusion that there is an animatory motion in plant cells, whose expansion summons fresh sap and whose contraction propels it further upwards, will scarcely fail to meet with favor. One can afford to smile at the conventional dictum, found in so many text-books, that the cause is capillary attraction. There is no such thing. There are of course the phenomena which it seeks to explain, but there is no such thing as an attractive force operating between two inanimate bodies, be these microscopically small or as large as planetary masses. Dead matter cannot exert a force; but can only be acted on by forces from without.

In regard to the phenomenon of water in a glass tube inserted in a glass bowl, rising above the surface of the water in the bowl, given as an experiment in text-books on Physics, I take pleasure in presenting in translation the following extracts from Swedenborg's Photolithographed MSS., Vol. VI, p. 102, which

are part of an article bearing the title: *Physical Experiments from Desagulles*.

"A liquor rises in capillary tubes, higher and more rapidly in thinner ones, almost according to the size of the diameter . . . water in a glass rises higher at the sides than in the middle, but contrariwise in mercury, higher in the middle than at the sides. . . . Mercury [however] touches iron, and does not draw away from it. . . ."

"The reason that a liquor rises up in capillary tubes, is because the aqueous parts are accommodated [in size and shape] to the parts of the glass, [as well as to] stony and saline [particles], and creep along those that are applied; and also because water has a very slight intracohesion [among its globules], as appears from its rain fall, in drops. Hence it rises up in smaller pores according to the application [of the given substance] and the cohesion [of its particles]. Likewise because of the air and the ether, [since] the full force [of each] does not act in capillary tubes, as it requires no reaction from the sides, which absorb the entire force; hence still more in capillary [tubes], where there are abundant walls which absorb this in the ether and in the air. Thus from both causes. . . .

"Otherwise mercury, which also coheres, but not directly, to the parts of its glass. It does the same [rising as water], if the vessel be of iron as has been noted with an iron key to which it adheres; for the parts of iron and of mercury are [mutually] accommodated, like the parts of water [with those] of salt, and of stone. But if the glass had a coating of iron, then [the rising] would not occur with water."

Sir J. C. Bose first describes, among others, the following experiment with a potted chrysanthemum plant: "Water was withheld for several days, and under the severe drought the plant collapsed and sprawled over the ground; all its leaves became crumpled and dry, and to all seeming the plant appeared to be quite dead. But irrigation of the plant with water containing a small dose of stimulating drug brought about a marvellous transformation. The plant began to revive from its death-like torpor; it began energetically to suck up water; its inert stem and branches became turgid once more; the plant

erected itself to its full stature, and its crumpled leaves became once more outspread in their normal condition. . . . The above experiments prove conclusively that the ascent of sap in plants is due to the activity of living cells."

Referring briefly to other theories, he does not even mention the conventional phrase about capillary attraction, but speaks of two others: "The latest theory that has found general acceptance is that the transpiration from leaves produces a partial vacuum in the wood-vessels, giving rise to a sucking force from above; there is in addition the mysterious 'root pressure' by which the root pushes up water from below. . . . The above theory is completely disproved by the following experiment. A *Chrysanthemum* plant had all its leaves removed and the stem coated with an impermeable varnish, thus causing a complete stoppage of transpiration. The root-pressure was eliminated by cutting off the root. The cut end of the stem was next placed in water, and the ascent took place at the rate of 60 feet per hour, and this in the complete absence of transpiration and of root-pressure. The ascent must, therefore, be due to some independent cellular activity present in the interior of the plant."

He then describes how he prepared a device for recording the individual cell's activities: "I have, however, been able to overcome the difficulty of securing contact with an individual cell by the invention of the electric probe. . . . It need only be stated here that the electric probe consists of a fine platinum wire in connection with a sensitive galvanometer; the probe is thrust in, gradually and step by step, from the epidermis outside to the pith in the interior. When the probe comes in contact with the active cell it sends out electric signals which are automatically recorded by the galvanometer. The up stroke in the galvanometer records expansion and absorption of sap, while the down stroke indicates expulsive contraction. It is thus found that the cells in the active layer are in a state of throbbing pulsation, expanding and contracting by turns; there is, moreover, a definite sequence of pulsation from below upwards. Each cell during its phase of expansion absorbs water from below, and expels it upwards during the phase of contraction. The ascent of sap thus takes place by the co-ordinated

activity of a series of vertically situated cellular pumps. The period of a single pulsation is about fourteen seconds; but under definite physiological variations the up and down strokes become quickened or slowed down to the point of arrest. The records show further that the epidermal cell is inactive, while the cortex which surrounds the woody tissue is the most active. The cellular activity is completely absent from the dead wood. The cortical sheath which extends throughout the entire length of the tree is thus the active medium for the propulsion of the sap; the wood vessels serve merely as a reservoir for storage of water for emergencies, water being injected into them during the active contraction of the cortex."

A book by the writer on "The Physiology of the Ascent of Sap" will be published shortly by Messrs. Longmans.

E. E. I.

THE ORIGIN OF MAN: TOGETHER WITH SOME NOTES ON EVOLUTION. By Alfred Acton, M.A., B.Th. 1922. Philadelphia: Swedenborg Scientific Association. Pp. 71. 60c.

Professor Acton's monograph is a comprehensive and more or less definitive statement of Swedenborg's doctrine of the origin of man, as embodied in his WORSHIP AND LOVE OF GOD. In contrasting this position—a position the most unique and profound ever placed before the mind of man—with the leading hypotheses advanced by typical religious and anti-religious circles, the author naturally pays the major attention to the positions expressed in the popular and loosely used phrase, "the evolutionary theory."

In this connection, Professor Acton has performed a signal and timely service by his clear differentiation of the common usages of this much abused phrase from the sense in which the disciples of Swedenborg may with honesty and propriety employ it. So lucid and cogent is this portion of the writer's argument, in the early part of the monograph, that it is difficult to grasp the position of the "friendly critic" (p. 62) who feels that it "will be taken by most readers as a condemnation of evolution *in toto*." It is not easy to conceive that any calm and fair-minded reader will adopt any such attitude; and we feel

sure that the author's clear rebuttal (pp. 62-71) would carry neither weight nor conviction to so marked a state of special sensitiveness.

The truth is, that the average layman's failure to distinguish between the theory of evolution as a scientific hypothesis and as a philosophical system; and especially his still more important failure to distinguish between the theory of evolution as based on true theistic principles and as based on a negative and naturalistic foundation;—has resulted in a vague and exaggerated impression of the real standing of this theory of which naturalistic thinkers and teachers have not been slow to take advantage. We can well understand that Professor Acton's straightforward and not too subtle challenge will be likely to arouse the unconscious prejudices of those who are too easily satisfied with terms, or with conclusions which—even to leading minds in the scientific world—seem less and less conclusive.

However, the chief value of this monograph lies in its powerful and eloquent plea that justice be done to Swedenborg's doctrine of human origins, as involved in the crowning work of his philosophical career.

Considering that the prime causes of evolution are singularly absent as the constituent themes of even the most hopeful phases of current evolutionary theory, one would imagine that Swedenborg's doctrine as to the origin of man would receive at least the careful scrutiny of serious investigators. Yet even amongst his own followers indifference, and even prejudice, towards this work seem to prevail.

This monograph, by the editor of the *NEW PHILOSOPHY*, is a much needed "missionary" effort to break a path for a wider and deeper interest in Swedenborg's supreme philosophical effort. At the same time, it furnishes the most careful and extensive statement of the doctrine, for advanced students, that has yet appeared in print.

W. W.

BOOKS RECEIVED.

THE WEDDING GARMENT: A TALE OF THE LIFE TO COME, by Louis Pendleton. Academy Book Room, 1922, pp. 246, \$1.25; white binding, \$1.50.

The New Church will welcome the reprint of this remarkable story of life in the Other World. The work is not only, to quote the Hertford Post, "unique, full of dramatic situations and telling incidents," but it is also full of spiritual and doctrinal instruction respecting the life of regeneration and its dramatic presentation in the scenes of the World of Spirits.

It is a work that should be read by young and old alike.

THE GOLDEN HEART AND OTHER STORIES, by Amena Pendleton, illustrated by Eudora Sellner. Academy of the New Church, Bryn Athyn, 1922, pp. 75, \$1.00.

This delightful little work consists of seventeen short stories for children, based on the memorabilia of the Spiritual World given in the theological works of Emanuel Swedenborg. At the end of the volume are notes giving the references used for each story.

The book will undoubtedly fulfil the Author's purpose of fostering in children a delight in things of the Spiritual World and this delight will be increased by Miss Sellner's charmingly simple illustrations.

INSIDE THE ATOM.

MODERN THEORIES AND SWEDENBORG'S "PRINCIPIA."

BY JOHN W. STOCKWELL.

Getting inside the atom has not only unfolded a new world to science but it has caused practically every individual branch of science to recreate its own world. The sciences of chemistry and physics have been remade almost over night. The work with a spectroscope has been so stimulated and augmented by the fairly thrilling achievements of Rutherford, Aston, Dempster and others with mass spectragraphy experiments, that astronomy has a focus of interest still more glowing than before. Even psychology is included in the new awakening, through the investigations by scientists as to the emanation of electrical forces from the human body.

The world of the atom is sub-microscopic. Just how minute it is the mind finds difficulty in grasping. Some assistance in this direction may be given by the following quotations from some of the latest works on the subject of the atom:

If 250 million atoms of copper or gold were put in a row, like marbles, touching each other, the row would be only one inch long. An electron is probably only one hundred thousandth of that of an atom in diameter.

If a hole could be punched in an electric light bulb small enough to let in a million atoms of air a minute, it would take a hundred million years to fill the bulb.

The atoms of matter are so small that it would take something like one hundred millions of them to bridge across a penny piece.

If an atom is magnified one trillion times, it would appear about an eighth of an inch in diameter.

Suppose we had means of segregating the individual molecules in a glass of water, and of labeling them so that we may recognize them again. Suppose then we emptied the glass into the ocean and let millions of years elapse, so that the water from our tumbler became thoroughly and uniformly mingled with that of the seven seas. Suppose after the lapse of this time we came back and took at random a fresh glass of water from the ocean—we would find in it no less than 1,000 of our labeled molecules. That is

to say, the glass of water is to the individual molecule as the combined oceans of a thousand globes like the earth would be to the glass of water.

If we could magnify the point of a pin a billion-fold, we should find that a billion billion molecules can rest comfortably on this small area.

We find in the new theory of the structure of the atom, postulating a nucleus of proton and electron and a surrounding satellite array of electrons, several concepts which remind us forcibly of the propositions laid down by Swedenborg in his *PRINCIPIA*. We shall not have time to discuss all of them with their analogies to what Swedenborg had written so many years before, but with your indulgence we shall here cite five, as follows:

I. Swedenborg explains the formation of the elementary particle by second finites and the actives of the first finite, "in accordance with the nature of each" (that is to say, with the motion of the active and the inertia of the passive) (P. I, Ch. 6, § 3, 4). He also describes the surface of this first elementary particle as being in a state of most perfect equilibration (§ 5). Further he writes "the polar axis of the particles is the same as the polar axis of the zodiac, and their equators are the same with the zodiac of the solar vortex" (*idem*, Art. 39). This is a masterful forecast of the "Lewis Langmuir Atom" with its nucleus of positive and negative bodies, its charge of revolving electrons in a series of shells or sheaths, one outside the other, and the equilibrium on the surface when the two forces are in balance to make a "neutral." Other points of similarity might be shown.

II. The approach of modern science to at least the beginning of an understanding of the principle of the spiral gyre and the vortex: Let us first recall our passage from the *PRINCIPIA*: "The element of the solar vortex is highly prone to spiral gyrations, it has a vortical gyration at a great distance from the earth, according to the theory propounded in our First and Second Part; and as it is not possible for the ethereal element to reach the length of this distance, but only to a shorter; the real vortex around the earth seems to consist of the element of the solar vortex" (P. III, Ch. 5, Art. 3). Then let us note a brief quotation from that remarkable work *UNIVERSE*, by Scud-

der Klyce, "We now have carried the splitting down to electrons as being definite *whirls* or molar bodies of a 'lower' order"—a reference had been made just before to the human body and mind "as being a whirl" (*Universe*, Pt. XI, § 100).

III. Emanations: "This sphere of emanating corpuscles exaling from all concrete bodies is never the same for any two bodies, not even for any two bodies of the same kind, this difference being in abundance, size and activity, as well as in generic type" (P. II, Ch. II). The concentration of the attention of the scientific world upon this subject due to the discovery of the radio-active family, springing from thorium and uranium as parents and the recent scientific research with the "dicyanic screen" demonstrating the existence of the so-called "human aura," are matters almost of common knowledge.

IV. In his Preface to the *PRINCIPIA*, Swedenborg writes that the visible world "cannot possibly have its termination in its own first or mediate series or line of progression, or in its first or second part; for were this the case, there would be no series in existence, neither would there be any ends; because there would be no distinctions into intermediates; consequently no element to constitute vortices; none to constitute ether or air; nothing to constitute fire; much less anything to constitute the innumerable parts of the mineral, vegetable, and animal kingdoms; in a word, there would be no world" (p. XVI). This principle of "Series and Degrees" causes an immediate and vital interest in the new theory, "Moseley's Atomic Numbers," which F. W. Aston characterizes as "the most important generalization in the history of chemistry since Mendeleef's Periodic Law."

V. The last analogy refers to a principle than which none other is more forcibly emphasized in the entire *PRINCIPIA*. It is the likeness between the beginnings of things and the ultimates. We have collated fourteen striking passages embodying this principle, but we shall content ourselves here with quoting only one: "That elementary nature is similar to itself both in the greatest and least things; in the macrocosm and in the microcosm; in a heaven and in a small volume; in a world and in a particle. In fine, we may perceive its form and effigy to

be the same in the largest mirror as in the least; it is visible however to the eye only in a large one, *i.e.*, not in a simple but in a compound" (P. I, Ch. X, Art. 8).

How remarkably this Teaching, which, in other words—namely, that "the Divine is the same in things greatest and least"—is given the hallowed clothing of Divine Revelation itself in the Theological Writings, is now being echoed in the new planetary theory of the atom! This theory begins with a clear definition in the work of Rutherford and is developed clearly by both Bohr and Langmuir. By it, to quote the words of Prof. Aston, the atom is conceived of as being equipped with "a positively charged central nucleus around which are set planetary electrons at distances great compared with the dimensions of the nucleus itself."

So firmly embedded is this principle of planetary action within the atom in the scientific thought of to-day, that one finds statements about it on every hand. Aston in his book just from the press on "Isotopes" makes several references to it, one of which we shall quote a little further on.

We find that the idea had to some degree been brought into the semi-popular field in 1920 when Dr. Henry Leffmann, of Philadelphia, published an article in the *American Journal of Pharmacy* on "Isotopy," in which he wrote: "The known elements, although a few score in number, present us with an epitomy of the evolutionary relations of nature at large, just as the modern theory of the atomic structure presents us with an epitome of the solar system, the nucleus with its more or less loosely held circulating electrons, resembling the sun with planets, moons, meteors, comets, and cosmic duet tributary to it."

Other quotations follow:

THE ATOM AND THE SOLAR SYSTEM.

Electrons are of two kinds, positive and negative, and an atom is a sort of solar system in which a number of negative electrons revolve round a nucleus composed chiefly of positive electrons (M. J. Grainger—*Amateur Radio*).

The atom seems to consist of a central positive nucleus,

which plays the part of the sun in the solar system, surrounded by a system of negative planetary electrons. The number of these planetary electrons is equal to the charge of the nucleus. If the complete history of the building of atoms could be unfolded, it would undoubtedly be seen to be one of fundamental importance in determining the present condition of the stars, and also of the surface of the earth and the organisms which dwell upon it (W. D. Harkin's Programme of Lectures in The Franklin Institute, 1921-22).

And the light waves, so physicists have come to think, are started by vibrations inside the atoms themselves, by movements of electrons from place to place inside the tiny intra-atomic solar system (E. E. Free—Popular Radio for June, 1922).

To get a clear idea of the atom, compare it to the solar system. Liken the sun to the positive charge and the planets to the electrons. The electrons are held in their orbits around the nucleus in much the same manner as the planets revolve around the sun (Laurence M. Cockaday, R.E., in *ibid.*).

The hydrogen atom consisting of a single electron rotating around a positive nucleus of unit charge has a fairly large stray field of force around it (S. Bushman, Ph.D., in Research Lab., General Electric Co.).

Sir Ernest Rutherford, speaking before the Chemical Society of London, said: "Thus the solid atoms conceived by Dalton are chiefly the spheres of influence of a tiny nucleus enthroned at the center of a vast realm of empty space."

Aston, describing the Bohr atom, declares in his book *ISOTOPES* (p. 95): "In this atom model the electrons outside the nucleus are supposed to be in a state of continual revolution about it, like planets round the sun. This rotation is considered to take place in orbits defined in a very special manner by means of a "quantum relation." This postulates that when, and only when, an electron changes its orbit, radiation is given out and the energy acquired by the change of orbit is entirely given off as radiation. This theory lends itself to exact mathematical analysis but unfortunately it can only be worked out adequately for the two simplest cases, the neutral hydrogen

atom and the singly changed helium atom. Here, however, its success is most remarkable."

It is a great temptation for a New Churchman, interested in the scientific writings of Swedenborg, to attempt the identification of discovery after discovery, as it develops in modern science, with some particular principle that Swedenborg has advanced. We recall what a New Church writer, wonderfully interested as well as interesting in the deduction so skilfully made from Swedenborg's Works, essayed in *THE NEW PHILOSOPHY* for October 1901; the "Identification of Hydrogen and the 'Third Finites' of *THE PRINCIPIA*." It was stated in that article:

"Here then we have a double statement of one and the same fact; giving definite basis for comparison.

"The molecule of water is composed of hydrogen and oxygen gases.

"The molecule of water is composed of Third Finites and Fifth Finites.

"Which of these two classes of finites constituting the water-particles answers most nearly in its characteristics to hydrogen gas?" The writer then answered the question with an argument likening the Third Finite to hydrogen.

Now that the hydrogen and the oxygen atoms are shown to have nuclei, each with its proton and two or more electrons, which nuclei constitute the real mass of the atoms and exist there under conditions as yet but slightly understood, the force of the above reasoning is weakened, at least until further knowledge as to the nature of the inner content of the nucleus is obtained.

We have gone through the *PRINCIPIA* carefully and gathered about a score of references to the "Fourth Finite," comparing them with what modern science teaches about the negative charges of electricity now called "electrons" and which Dr. C. E. Kenneth Mees of the Eastman Research Laboratory insists may not be so markedly "corpuscular" as a "long train of waves of a very small diameter travelling with a velocity of light" (see his account of the work being done by Dr. Silberstein; *Scientific American*, May, 1922), and which he says

should be called "light darts"; and in our comparisons we find strong ground apparently for associating the Fourth Finites with electrons.

REFERENCES IN THE PRINCIPIA TO THE FOURTH FINITE.

"With regard, therefore, to this fourth finite, we observe, that it is similar to the third; that the third is similar to the second; the second, to the first; the first, to its simple or point; and consequently that the fourth is similar to all the finites and to the point. That hence it is put into motion in a similar manner; it can be similarly passive, and constitute the surface of any particle; and can also be similarly active. That its attributes, essentials, and modes, are similar to those of the third finite; that it differs from it only in dimension, and consequently in degrees and moments. That its origin is similar to that of the preceding finite, for it arises from the second elementary particle in the same manner as the third from the first elementary particle. That the cause and place of its origin are the same; or that it is near the solar active space, where the second elementary particles were capable of being compressed into finites. . . . the only difference between the fourth and the others being the difference between greater or less. We may thus see that it derives its origin from the second elementary particle, in the same manner as the third finite from the first elementary particle; consequently, that they are of a different dimension; that the fourth finite consists of individuals which are third finites; and that thus the third finite is raised to a higher power. We now proceed to shew that the whole solar and planetary chaos consisted originally of these fourth finites" (III, iii).

With respect to causes we may observe, that they are no other than those which are latent in the first principles; that is to say, in the active, the passive, and the elementary which is compounded of both. With respect to time, the planets could have no origin before the existence of causes to produce them; that is, before the existence of actives, passives, and elementaries; with respect to place, their origin could be nowhere else but in the place in which their causes concurred to produce

them; which could be only about the active solar space, where everything is present which could compound and give birth to such effects (III, iv).

That nevertheless this crust, consisting of fourth finites, which is formed around the sun, is rotated in a certain gyre; that it is thus representative, as it were, of an active center in forming and perfecting the vortex, around which, consequently, the elementaries can nevertheless flow in a vortical current, but with a potency and force different from that which they would possess in case the solar space acted nakedly and contiguously upon the circumfluent elementaries. That this congeries and crustaceous compages, consisting of fourth finites and surrounding the sun, has nevertheless a circulatory motion, is evident from this, that it is formed in this very motion itself. When the elementary particles cease to be elementary, the cessation is in consequent of the motion of the particles in contiguity, and is thus effected in motion. Hence, in every degree of compression, they retain and preserve the impressed force. By the compression of the elementaries upon the finites, no other state is induced upon them than the one which existed during the state of compression; the actives within constantly acting in the space, and an immense volume of elementaries without being put into a vortical motion, just the same as we see in our own visible world. When, for instance, a volume of water is carried round a center or axis, we find that when the impulsory motion is stopped, the motion at first impressed nevertheless continues; until, in consequence of the mutual contact and renitency of the parts, a state of quiescence begins to be superinduced. Hence in the crust also which surrounds the sun, the pristine state of motion is for a considerable time preserved, and is changed only in consequence of an increase in its quantity, and after a certain interval; it may moreover be rendered less compliant, by reason of a condensation and multiplication of the parts, and by reason also of a lapse of time. For the parts tend to a state of equilibrium; and inasmuch as they are not elementary, they in course of time gradually tend to a state of rest. In the meanwhile, as the forementioned crust is continuing its motion round the sun, it is not unlike the effluvium circulating round a magnet; which,

by means of its motion round an axis, constitutes an active centre; so that all the elementary particles can move around the crust as a centre, and the vortex itself be advanced to another stage of formation (III, iv, 4).

That this crustaceous expanse may subside partly into itself, and thus consist merely of a volume of finites; that it may partly subside inwardly, or toward the solar space, and thus revolve itself round some active space; that it may partly subside exteriorly or toward the vortex, and thus enclose a volume of elementary particles. Thus that there may exist bodies of three different kinds, namely, planets, satellites, and erratic bodies straying round the sun, such as we are accustomed to denominate solar spots (*ib.*, § 7).

These individuals therefore, or fourth finites, operate in the large body or system in the same manner as they do in the smaller. If therefore a planet derives its similitude from its own finite, or its individual parts, it does so more particularly in respect of its tendency to a similar motion, or a similar intrinsic and progressive motion, and a similar axillary motion. These are the essentials of every finite in its least boundaries as well as in its greatest. That every planet possesses a progressive motion, we shall demonstrate in our theory of the earth, when we come to treat of its polar vibration and the progression of the nodes in the ecliptic, which is the slower in proportion as the finite is the larger or more extensive . . . hence in this our large planetary finite, we have from a like cause an axillary motion in conformity to the plans of the equator (III, v).

That these fourth finites flow more at liberty near the surface of the earth, and there only can dispose themselves and have free scope for any given motion. That this is a consequence of the former proposition. That hence they are there occupied by the particles of the circumfluous element, and formed into new elementary particles, which interiorly contain a small volume of the particles of the first element, the fourth finites constituting the surface; that is to say, those finites of which our new orb consists. That these new elementary particles are the same with the ether. This we see illustrated in the case of water

and every liquor which evaporates only at the surface. The fourth finites or individual parts of the earth possess their own inherent and natural force, by means of which they have a tendency to motion; and especially at the surface where the elementary particles of the fluid vortex are contiguous and in perpetual motion, particularly in the vicinity of the sun. From the operation of this two fold cause they convolve themselves into new particles, in which the elementary particles of the vortex are enclosed; the fourth finites constituting the surface; corresponding to the case of the first and second elementary particles round the sun, of which we have spoken in Part I, Chapt. VI, Art. 3; and Chapt. X. Thus have we new elementary particles entering into the system and constituting a third element, or the ether. Hence it follows, that in course of time there sprang forth a large quantity of these elementary particles or ether, inasmuch as a large volume of elementary particles may arise from a small volume of finites; and hence the new earth experience a considerable diminution at its surface, before the whole sphere of ether became perfectly formed around it (III, v. 2).

That inasmuch as this new earth continually rotates round its axis, and exposes once every day its whole surface to the sun; these new elementary particles take their rise all over the surface, are generated over the whole circumference, and do not proceed from one part more than from another; . . . Now inasmuch as the gyratory motion of the ethereal sphere commences from the moment of the origin of the sphere, when the quantity of ether is as yet but small and extends only to a small distance from the earth, it follows that the element continues to gyrate during its increase so long as the center is active. But inasmuch as the element of the solar vortex is highly prone to spiral gyrations, it has a vortical gyration at a great distance from the earth, according to the theory propounded in our First and Second Part; and as it is not possible for the ethereal element to reach the length of this distance, but only to a shorter; the real vortex surrounding the earth seems to consist of the element of the solar vortex (*ib.*, § 5).

The ethereal particles are in perpetual motion, because they

are perfectly spherical, as also yielding and elastic, and because they touch each other only in one point. The only circumstance which can mechanically impede and retard their motion is that of contact in several points or at a larger angle; now in a sphere there is no angle but a general or circular one, than which there is nothing more highly accommodated to motion (*ib.*).

That in the highest degree of expansion the elementary particles may become disrupted, and cease to be elementary; but that nevertheless the finites, inhering in their surface, and which are now escaping by reason of the disruption, cannot actuate themselves, but must illapse into some of the surfaces of the neighboring particles, and there like finites continue their motion as before in some other surface; so that by the dissolution of the particles and their illapses into the neighboring surfaces, there is imparted to the surfaces the power of expanding themselves further, and occupying more space, so far as the quantity of enclosed elementaries permits. On this subject see Part I, Chapt. VI, Art. 14 where the same phenomenon is presented to us, together with its causes and effects. The cause of the disruption is the expansion to a degree beyond that which the quantity of particles pressing from within permits; or it is a deficiency of the finites which would have occupied the superficial expanse, and which, if rarified, cannot be in any mutual colligation one with another (*ib.*, § 12).

That the fourth finites constituting the surface of the ether, are in a situation perfectly regular; extending by continual spires from one polar point to its opposite; and that by reason of this situation there is mutual connexion between them; consequently that any motion received by this surface must necessarily, in virtue of its contiguity and situation of the parts, circumfuse itself in an instant, and occupy the whole surface of the particle at one and the same time. That in consequence of this spiral situation of the parts in the surface these ethereal particles arrive with difficulty at a state of rest; more particularly when rendered the more rigid by motion; in which case they revolve with the most rapidity round a center in the same manner as the first and second elementary particles around their axis (*ib.*, § 13).

If therefore every particle of ether in the surface consisted of a hundred finites (fourth), the particle would not much exceed in mass the fifth finite rendered active, and thus may this active perform its gyres within an ethereal volume, although not without experiencing some renitency. Fourth finites, however, when rendered active, remove from them the ether according to the principles we have laid down, and cannot perform their gyres within its volume as we have above stated. Inasmuch however as the actives of the fifth finite cannot but whirl about their volumes among the particles of ether, by acting upon, soliciting them, and urging them hither and thither, in order to form a space to themselves; and inasmuch as these particles, being most highly mobile, readily yield to actives thus in motion, it follows that the ethereal particles cannot but be, according to our theory, when in the highest state of motion, in a state of the tensest expansion, and when expanded occasion (intendant) a degree of heat and fire, particularly if there be any connexions of parts upon which these particles cannot operate in their own way, that is to say, both by a central motion and by expansion. The ethereal particles in this state of motion and expansion cannot but, to a considerable distance, dispose the volume or contiguous expanse of their particles into a certain state of motion, so that the ether may impinge upon the parts it meets and which are variously configured, and by reflecting and refracting itself present various modifications to the organs of vision, which also contribute their own share in producing the effect. If the number of actives increase and the space be rendered still more strongly active, it follows that the ethereal particles possessing a less force of resistance are compelled both in place and space to give way; they also partially experience a disruption, particularly if they are very rare and begin to be separated from their contiguous expanse. If they experience a disruption, then not only a larger number of actives enter into the space, but also a stronger force (Part I, Chapt. VII, Art. 19); for the actives of the fourth finite can operate upon their own smaller connexions both in virtue of their smaller mass and their greater velocity, as well also as the actives of the fifth finite (III, viii, 11).

The finites constituting the surface of ether, are of the fourth genus, and in these the point is raised to the fourth degree and power (*ib.*).

That the space consisting solely of actives of the fourth finite and enclosed by the ethereal volume, can transmeate the atmosphere with a perfectly free current; that it may as it were cleave through and penetrate even the hardest bodies; that it may in its passage break and dissolve their more subtle connexions, and give rise to more phenomena than the space which is formed by the actives of the fifth finite. For actives of the fourth finite can be enclosed only by a volume of ethereal particles, and consequently a space of this kind freely permeates the atmosphere and interstices between its particles (for the air cannot retard its passage, because it is of larger dimension) and the moment it touches a particle of air it breaks and dissolves its connexion; it does the same with other corpuscles and effluvia floating in the atmosphere, as also with whatever larger and harder bodies it meets; moreover the force of the space is increased and becomes more intense by the solution of the ethereal particles separated from its volume. Hence it is that this kind of fire is called elementary, because being generated in the form of lightning in the superior regions it tends to the inferior and carries with it a matter having a loose consistence of fourth finites; from which, as from a most subtle sulphurous substance, new actives and aliment pass out perpetually into the space (III, viii, 16).

That of these fourth finites it is that the central globe of the earth consists, but that they cannot make any eruption and actuate themselves without being immediately occupied by the first elementaries, and converted into ethereal particles, according to the theory above laid down. That if however there were a passage leading from the centre sufficiently open for the fore-mentioned finites to escape through it, an active space would be formed by that part, at our present distance from the sun; and that when formed it might continue to subsist so long as fresh finites constantly emanated and as it were germinated into the space; but that by means of this space the sphere of the ether would considerably enlarge itself, and the earth would lose that

equilibrium which it now maintains at its present distance from the sun and in its present vortex, and consequently that it would undergo some signal change not only in regard to its situation and to the circle it describes in its vortex but also in regard to its polar situation and axillary motion (*ib.*, § 17).

But, heeding our own warning, we shall do nothing more at this time than merely to suggest the fascinating interest there is in following out these apparent parallels of quality and function, between Fourth Finites and electrons, reserving any conclusions for or against until further knowledge has been obtained about the atom nucleus.

We wish to bring before you another and a very beautiful proposition advanced by F. W. Aston in discussing Crookes' theory of the evolution of the elements, which Crookes imagines to have begun in what he styles "the original protyle." Aston says: "This vivid picture may be brought up to date by the substitution of free protons and electrons for the hypothetical protyle. We can imagine regions containing matter where the temperature is so high that not only is the dissociation of atoms from atoms and nuclei from planetary electrons complete but also protons and electrons are in a state of agitation so violent that even the most stable nuclei cannot be formed. We should have here matter of the simplest form at all, or rather of no form at all, simply a more or less neutral electric gas. Such a condition is by no means impossible in our universe and may actually occur during one of those excessively violent catastrophes occurring in far distant space and observed by us as new stars."

Now turn from this generalization, at once so broad and so penetrating, to Part III, chapter 4, in "The Principia" and read:

"Stars have been known to come into view, and after a lapse of time, to grow obscure and imperceptible; then again to become visible and again obscure; so that either they altogether disappear, or else, unless some neighboring stars should in the meantime occupy their vortex, remain in view permanently. Here then we see the origin of the planets actually imaged forth to the eye. We see, as it were, the same incrustations arising

from the compression of the circumfluent elementary parts, and veiling over the star or sun to which they belong; we see also their repeated dissipations and separations. Astronomy is full of phenomena of this kind, and to this very day continues to offer to the eye those representations of chaos of which we have been speaking; forbidding as it were a single doubt upon the subject."

How close the parallel! How similar the vision which the words of the great Swede calls up, taking even a disconnected passage without reference to the transcendent cosmology that lies so brilliantly behind it! How like it is to the picture which the learned English scientist would summon to our view!

In determining upon the title for this paper, "Cosmic Contrasts," we were strongly impressed by the accumulating evidence that the theme of "Greatest and Least" which has become the vehicle for one of the most fundamental Doctrines of the New Church and the previous and highly prized mode of thought by which we conceive of the organization of the heavens and the earth;—that this theme is permeating rapidly into the thought of the day. We find it appearing not only in the sciences of chemistry and physics but in physio-psychology and in anatomy and, as we have already intimated, in the new science of physico-electricity.

"The heavens declare the glory of God; and the firmament sheweth His handiwork" (Psalm 19:1) was the thrilling declaration of the Psalmist. And they do. The heavens have for centuries forbidden by the very force of their cosmic splendor the neglect of the thought of God whether the observer were the astronomer seated at his point of observation, behind the mammoth telescope, or the humble shepherd in the field keeping watch over his flock by night.

The planets above and the planets beneath, those swinging wide through the sidereal heavens in the path of the giant zodiac; or those in their no less majestic gyre of sub-microscopic limits revolving around the nucleus of the atom, all are telling silently but insistently of the glory of God.

The Truth is mighty and it will prevail.

Sang Bourdillon:

"The night has a thousand eyes,
And the day but one;
Yet the light of the whole world dies
With the setting sun.

The mind has a thousand eyes,
And the heart but one;
Yet the life of a whole life dies
When love is done."

So is eloquently suggested that hope which is in our hearts to-day that the world which views with such awe the "night of the thousand eyes" may some time bow before Him Who is the Rising Sun With Healing in His Wings and in those cosmic contrasts now capturing the thought of so many eager, alert and inquiring minds may at length point the mind to the Holy Revelation wherein He is glorified as the "Alpha and Omega" "The Beginning and the End."

A PHILOSOPHER'S NOTE BOOK.

CONTAINING EXTRACTS FROM THE PHILOSOPHERS, TOGETHER
WITH SUNDRY MEMORANDA AND SMALL WORKS.

BY

EMANUEL SWEDENBORG.

ERUDITION, WISDOM, INTELLIGENCE, BEING LEARNED.

ANDR. RYDELIUS.

Wisdom is architectonic (constructive) prudence regarding the highest good. Prudence is founded on sensation and the intellect [*Förnufts Ofningar*, P. III, C. 7, p. 141]. In intellect are science, prudence, wisdom [*ib.*, p. 140].

Prudence without wisdom seizes upon the decorous and the partly useful; but wisdom seizes upon the necessary [*ib.*, p. 141].

Erudition is divided into False, Superficial and Solid. The False is error under the appearance of science; the Superficial is either memory, or is science without intellect*—as illustrated in the half learned; the Solid conjoins sense and reason, science and prudence. Erudition is called Pedantry, when a man of false and superficial erudition makes boast and display thereof. Books have been written on the charlatanry of the learned,—a term which means the public display of vanity by literati† [*ib.*, p. 144, 145].

Wisdom is founded on a true, inmost and subtle sensation of

* According to the Swedish this should be "without sensual experience and prudence."

† A literal translation of the Swedish reads: "A fine oration on the subject of pedantry, has been written by Ulricus Huberg.

Menken has the same thing in view, in his polished work *Charlataneria Eruditorum*, a term which means the saucy yells or silly boastings of a crowd of the learned."

the soul; and therefore it does not easily go forth into speech‡ [ib., p. 147].

AUGUSTINE.

The seven degrees leading to wisdom are: 1. Fear [of God exciting in us the thought] of our mortality and of our future death. 2. Piety,— to become humble therein, and not to contradict Sacred Scripture. 3. [The Knowledge] that God must be loved for the sake of God, and the neighbor for the sake of God. [With this] one does not boast, but is sorrowful, and implores the consolation of God in prayer. 4. Fortitude, in which one hungers and thirsts after righteousness. 5. He greatly exercises himself in love of the neighbor; and in this he is perfected even to love of the enemy. 6. He purges the eye itself, whereby God can be seen; for men see Him just so far as they die to this world. 7. Wisdom, which he enjoys in peace and tranquillity [*De Doctrina Christiana*, II, vii, III, 10EFGH, 11A].

ARISTOTLE.

According to the common mode of speech, philosophy and wisdom are one and the same thing. The sophi were called

‡ The passage from which this quotation is taken reads as follows: "A young man may have as much to say as an old one, and perhaps a good deal more, since he has a better memory, a more lively imagination and a greater boldness. But he lacks that fine and delicate taste by means of which the old and tried man, by reason of his long experience, tests every appearance of truth, use and happiness. It is his misfortune that he cannot well give verbal expression to such taste, because it is founded upon an inexpressible, internal sensation. Therefore it is that he must often submit to being defeated in argument by bold youths who can use

their tongue well. Aristotle spoke very appropriately in regard to this matter when he said that one often has reason to believe an old master on his word, even though he may not be able to demonstrate what he says. It would be desirable if a true master in wisdom could have this privilege when he is called upon to dispute with a worldling concerning true happiness. Wisdom rests upon an inmost sensation of the soul, its inmost and most delicate taste. For it is treasured up in the heart, for the most part, and does not come forth completely on the tongue. . . . To know the world internally means much more than to be able to speak about it."

philosophers. Pythagoras called himself a lover of wisdom. The ancients estimated wisdom as consisting in the knowledge of the most profound things; as did those who wrote concerning the causes of things, principles, things divine, providence, virtues, etc.* It is taken also as meaning theology, and metaphysics. Science is defined as the true, certain and clear knowledge of a thing by means of its own cause.**

We also define knowing, as learning by demonstration; and I call demonstration a scientific syllogism.† . . . If therefore knowing is what we have stated, then necessarily demonstrative knowledge must come from first, immediate, better known and prior truths, which are the causes of the conclusion; thus they will also be the genuine principles of the thing demonstrated (Aristot. *Analyt. Poster.* L. I, C. ii [I, 188B]).

[I call those things *prior and better known in respect to us*, which are nearer to the sense]; but things which are further away, I call simply *prior and better known*. Things which are further away are universals, while things near-by are singulars; and the two are mutually opposed to each other (*ibid.* [188DE]).

All sciences‡ communicate with each other according to generals. I call those generals, which men use as things from which to demonstrate, but not those concerning which they demonstrate, nor that which they demonstrate. Dialectic is general to all the sciences (Aristot. *Analyt. Poster.* I, xi [I, 201CD]). [The principle§ of those things which can be comprehended by sciences, is not itself the subject of science or art

* In the transcript on which the present translation is based, this passage reads: *Veteres existimant sapientiam in rerum altissimarum scientia positam esse, ut quidem rerum causis principiis, divinis, providentia, virtutibus est differenter: sumitur etc.* The words which we have italicized are noted by the copyist as being doubtful readings; but with these readings the sense is not clear.

Our translation is based on the following revision of the text: *ut qui de rerum causis . . . virtutibus etc., disserent.*

** This passage is manifestly not taken from Aristotle. It is probably Swedenborg's own note on the subject of wisdom.

† A Syllogism which causes one to learn or know (*scire*).

‡ Or Knowledges (*scientiæ*).

§ *I.e.*, the first principle.

or prudence. For that which can be comprehended by science, is demonstrable, while] art and prudence are engaged in things which may be variously circumstanced. [Nor can the principle of these things be the subject of wisdom. For] it is the part of a wise man to be able to unfold the demonstration of all things. [If therefore there is nothing whereby we enunciate truth without ever being deceived] except science, prudence, wisdom, and mind or intelligence; and if principles cannot be the subject of any of these—I mean, of the first three, prudence, wisdom, science; there remains the conclusion that principles are the subjects of the mind (*De Moribus* [*Nichom-Ethics*] L. VI, C. vi [III, 101C]).

If there is another nature and substance, separable and immovable, then necessarily, the science thereof is also different; and it is prior to natural science and prior to universal science* (*Metaph.* XIII, vii, *fin.* [IV, 462E; Bek. 1064†]).

All things are effected by some science, whether born or connate. Born science has a certain imitation of nature, as is evidenced in the fact that the knower (*sciens*) aspires to science that he may produce something exactly similar to nature. But
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connate and natural science is not manifold but unique; and if it be within the primary and active intellect, it is there *per se*, and could not have been acquired from any prior science by learning. . . . The science of the active intellect is a certain quality therein, and is not its essence; but science is the true substance of the knower, and substance is his true science. The first substance has this science, which we call true science, from itself; nor is any substance that lacks such science a true substance; consequently, it is a substance which is so called accord-

* This follows the Latin translation in Du Val's edition, from which Swedenborg's quotations are taken. The Latin here is *naturali prior et universali prior*. But the Latin version in Didot's edition of Aristotle is *naturali prior, et universe quia prior* (prior

to natural science and universal because prior). The same reading is followed by Bohn and Ross in their English translations.

† In Bekker's edition the reference is, L.XI C.vii. In Bohn's translation it is, Bk.X ch.vii

ing to birth (Aristot. *De Divin. Sapient. secund. Aegypt.* XIV, xiii [IV, 675D]).

PLATO.

As I do not know anything, so I do not deem myself to know anything. In this particular then I seem to be a little wiser than he, since I do not think myself to know what I do not know ([*Apologia Socratis*] p. 21 [DE, vol. I; 1 Bohn, § 6, p. 7]).

The poets say many fine things, but they understand nothing of what they say. They spoke from a certain impulsion of nature, and with the fire of some divine enthusiasm (*Apologia*, p. 22 [C; 1 Bohn, § 7, p. 8]). God alone is wise, and the pronouncement of His oracle seems to be, that human wisdom is to be counted as of little value, nay of none at all. . . . There is a great and abundant multitude of men who suppose that they know much, and yet know little or nothing (p. 23 [ACD; 1 Bohn, § 9, 10, p. 9]).

Wisdom is the mistress and queen of all the sciences. Her greatest work is the conservation of the human race, namely, that the society of men may be held in the bonds of a just and moderate empire, and men lead their lives in a voluntary empire. [The habit of prudent men is indeed efficacious for learning this faculty of wisdom; but it is clearly necessary that to this must be added divine beneficence which is the head and foundation of the wisdom that is to be learned. For the obtaining of this divine beneficence God must be implored with prayer and sacrifice, whereby He will be with us with His favor and grace (*Theages* [Axiomita*], p. 120 [vol. I]).

Wisdom can never be perceived by the sight of the eyes. If her form and, as it were, her face were discerned by the eyes, she would arouse a marvellous love of herself (*Phaedrus*, 250 [D, vol. III; 1 Bohn, § 65, p. 327]). The wise man should

* In the Stephanus edition of Plato, which is the one used by Swedenborg, the editor, Joan. Seranus, introduces each of the dialogues with an "argumentum," followed by a series of axioms in

which he attempts to embody the leading teachings of the dialogue. It is from these axioms that the quotation printed in the text is taken.

be wise for himself especially [*Hippias Major*], 283[B, vol. III; 4 Bohn, § 6, p. 215].

It behoves a wise man neither to rejoice nor to grieve,—as is the case with the gods; and consequently to indulge in no pleasures (Philebus†).

Unwisdom and insanity seem to be the same thing. We say that the unwise are all insane (*Alcibiades* II, 139BC [vol. II; 4 Bohn, § 2, p. 370]).

They are philosophers who enquire into the natures of such things as are circumstanced always in the same way and under the same laws. On the other hand they are not philosophers who spend their time in matters that are manifold, being not uniform or the same, but ever shifting and mutable (*De Repub.* L. V. 484[B, vol. II; 2 Bohn, ch. i, p. 169]). He must have a naturally good memory, learn with ease, and be generous and kindhearted, the friend and brother, as it were, of truth, justice, manliness and temperance (p. 487[A; 2 Bohn, ch. ii, p. 172]). When the philosopher wholly devotes himself to what is divine and beautiful, and dwells assiduously thereon, it must needs be that he himself will become divine and beautiful (p. 500[D; 2 Bohn, ch. xiii, p. 188]).

All the rationale and practice of the arts has a tendency and power to reveal to us the natures of things heavenly and human. Thus it lifts up our soul to its own best part, that is, to the

† This seems to be a paraphrase of the following dialogue:

SOCRATES, Is there not then a third state in us, besides the state of rejoicing and sorrowing.

PROTARCHUS, Why not? . . .

SOCRATES, If a man chooses to live a life of wisdom there is nothing to hinder him from so living.

PRO., Do you mean that he will neither grieve nor rejoice?

SOC., Yes; for in our comparison of various kinds of lives, it was said that there is no necessity for the man who has

chosen a life of intelligence and wisdom in any way either to rejoice or to grieve.

PRO., That was certainly said.

SOC., Would not such a manner of life be most in harmony with a wise man? And there would be nothing absurd in our holding that of all kinds of life this is the most divine.

PRO., It is reasonable to suppose therefore, that the gods are affected neither by joy nor by sorrow?

SOC., Most reasonable (Vol. II, *Philebus* 33AB; 4 Bohn §63-4, p. 46-7).

mind; and with the guidance of this, it ascends to the contemplation of that which is best in existing things; just as, in the case of things corporeal, it leads our eye to behold that which is brightest in the corporeal body and visible universe, namely, the sun and stars* (*De Repub.* L. vii, 532[CD, vol. II; 2 Bohn, ch. xiii, p. 222]).

What reason is there, why we should suppose that God, who is the author of all goods to us, is not also the cause of something far greater and more excellent, namely, wisdom? By God I mean heaven. . . . For all men loudly confess with one voice that the cause of all goods to us, is heaven. . . . Heaven bestows upon us wisdom, together with number and all other goods (*Epinomous* [976E], 977[AB, vol. II; § 6 Bohn 3, p. 9, 10]).

CHRIST. WOLFF: in *Psychol. Rat.*

Wisdom is the science of prescribing to free actions, ends agreeable to their nature; and of choosing the means leading thereto; and of so subordinating particular ends to each other, that the nearer become the means of the more remote (n. 678). Human wisdom in respect to its several parts† is very limited (n. 691). No man is wise in all things (n. 692). Aecessandae quam contingentes (List: cap. 8, I, 14‡).

Among things possible is that which is called the science of simple intelligence, which is concerned both with things and with their connections, and with both as§—

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* The Latin translator has here gone further than usual in his free paraphrasing of the original Greek. As literally rendered, the passage reads: All the practice of the arts has this power, namely, to lead back the best part of the soul, to the contemplation of that which is best in existing beings; just as that which is clearest in the body is led to the contemplation of that which is brightest in the corporeal and visible world.

† Wolff defines the three parts of wisdom as, Determination of the end, Choice of the means, and Subordination of particular ends (n. 691).

‡ We are at a loss to interpret this reference.

§ This unfinished paragraph is apparently not a question, but the expression of the writer's thought resulting from his citations on the subject of Erudition, Wisdom, and Intelligence. The reference

MODE MODIFICATION.

ANDR. RYDELIUS.

Mode is the same as accident, which may or may not be present, the essence still remaining. For instance, the body, whether moving or at rest, is still a body.

Absolute modes [are those which, in themselves, are actually such as they are observed to be; they] are size, figure, situation, motion, rest. But color, sound, odor, taste, cold, heat [etc.], are not absolute modes because they depend on sensation. The former are called general modes [because more than one external sense can bear witness to them simultaneously]. The latter are called proper modes [because they can each be perceived by one sense only (*Förnufts Ofningars*, Pt. III, p. 153)].

MALEBRANCHE—*De Veritate*.

Since the mode of an entity is nothing else than the entity itself thus modified,—the roundness of wax for instance, being nothing else than the wax itself disposed in this way,—it is clear that the mode of an entity cannot be conceived of without the entity. If therefore extension were a mode of an entity, then extension could not be conceived of without the entity of which the extension would be a mode. Yet extension can be readily conceived of by itself. Consequently it is not a mode of an entity, and therefore it is itself an entity. Thus it constitutes the essence of matter, since matter is a unique entity, and not a compound consisting of many entities (L. III, c. viii [p. 222; 1a Eng. 66-7]).

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ERUDITION, WISDOM, INTELLIGENCE, DOCTRINE.

SCRIPT. SACRA.*

They turn aside to vain speech, desiring to be doctors of the law, when yet they understand not what they speak, nor whereof they affirm (I Timothy, i [6], 7).

to p. 55 simply indicates the page where the citations on this subject are continued; and where they are followed, by what appear to be further reflections.
* Beza's version.

He is puffed up, and knoweth nothing, but is insane about questions and the strife of words, whereof cometh envy, conflict, cursings, evil suspicions (vi, 4, add. vers. 5, 20).

When they professed themselves to be wise they became fools (Rom. I, 22). I desire you to be wise in good things and simple in evil. To God, Who alone is wise, be glory (xvi, 19, 27).

To them that perish, the preaching of the cross is foolishness, but to them that are saved, that is, to us, it is the power of God. It is written, I will abolish the wisdom of the wise, and the intelligence of the intelligent I will take from their midst. . . . Hath not God made foolish the wisdom of this world? . . . For the foolishness of God is wiser than men, and the weakness of God is stronger than men. . . . Ye are of Him in Christ [Jesus], who for us was made wisdom, from God, and righteousness, and sanctification and redemption (I Cor. I, 18, 19 [20], 25, 30). See *Spirit*, p. 175, 176.

[I have laid the foundation and] another buildeth thereon; and let every man see how he buildeth thereon. . . . If any man's work that he hath builded thereon, abide, he shall receive a reward. [If any man's work burn, he shall lose, but himself shall be saved; yet as it were by the fire] (I Cor. iii, 10, 14, 15).

[Let no man deceive himself.] If any man seemeth to be wise among you in this age, let him be a fool that he may be wise. The wisdom of this world is foolishness with God. . . . The Lord knoweth the thoughts of the wise that they are vain (I Cor. iii, 18, 19, 20).

If any of you lack wisdom, let him ask of God who giveth to all men liberally, and reproacheth not, and it shall be given him; but let him ask with faith, nothing wavering, etc. (James, I, 5, 6).

The wisdom that is from above is first pure, then peaceful, even, and easy to be entreated, full of mercy and of good fruits, without disputation, and free of all simulation (iii, 17, 18).

He that knoweth to do uprightly and doeth it not, is held in sin (iv, 17). There is wisdom, let him that hath understanding, etc. (Rev. xiii, 18).

MALEBRANCHE—*De Veritate*.

Those who read the works of Aristotle [and Plato] have no other object in view, than accurately to store up the dicta of these authors in their memory, and are little solicitous as to whether or not they are in harmony with reason. The science and philosophy which they learn, is, therefore, a science of the memory rather than a science of the mind (L. II, p. ii, C. v [p. 126; 1 Eng. 187]).

There are two kinds of wits. Some readily perceive the differences of things; these are true wits. Others imagine and suppose a resemblance between them; these are the wits whom we call superficial (L. II, P. ii, C. ix [p. 141; 1 Eng. 211]).

It is quite evident that no one can clearly and distinctly learn the particular phenomena of physics (or natural history) unless he knows its general principles, and also advances to metaphysics (L. II, P. II, C. ix [p. 144; 1 Eng. 217]).

Wisdom is to intend uses and continually to advance to them, favoring nothing except for the sake of ends. The degree of the wisdom, or of its perfection, depends on the manner in which it forms the connection of ends. From the ends or uses themselves which the mind intends and to which it advances, is known the quality of the wisdom. We have also a lowest wisdom, which is for the sake of one's own use alone; a greater for the sake of society; and a greatest, for the glory of God. If these three are together and are mutually subordinated to each other, it is best of all. *Prudence* is the directing of these things. *Providence* is the doing of this for the sake of things yet to be. The ability to search into things is *perspicacity*, *ingenuity*, *clarity*, hence intellect and reason.

But in our present state, for the obtaining of wisdom, we need as a foundation, *science*, or the *knowledge of good and truth*. For the knowledge of these, there is required *experience*. With the knowledge of good, concurs nature with its signs from harmonies.*

* These passages appear to be Swedenborg's own reflections.

LOGIC SYLLOGISM.

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ANDR. RYDELIUS.

The thing of value in the ancient logic now lies concealed like a diamond in the midst of chaff, or rubbish.*

Genus=A Quadruped. Species=An Ox. Individual=This Ox. The subject is the thing treated of. The Predicate or attribute is what is said of the subject. We have also container and thing contained. . . . A fundamental is a predicate of the container which is applicable to all contents. . . . We have also the rule: When a containing attribute is applicable to a subject, then all the attributes contained thereunder are also applicable [*Förnufts Ofnigars*, Pt. V, C. ii, p. 338, 339, 341].

A sorites† is formed by a series and chain of consequences [*ibid.*, 350].

The first figure of a complete syllogism has four modes, the names of which are *Barbara*, *Celarent*, *Darii*, *Ferio*. But attention must be paid to the vowels. A, signifies universal affirmation; E, universal negation; I, some affirmation or a particular affirmation; o, a not, or a particular negation.

1.

- Bar— Everything that has mobile parts, is divisible.
Major premise.
ba— Every body has mobile parts. Minor premise.
ra. Everybody is divisible. Conclusion.

2.

- Ce— No spirit is divisible into parts.
la— Everything that is self-conscious is a spirit.
rent [E] Nothing that is self-conscious is divisible into parts.

3.

- Da— Whatever is divisible into parts can be naturally destroyed.

* I have been unable to find this passage in Rydelius.

† A term of logic used to indicate a connected series of syllogisms.

- ri— Certain entities are divisible into parts.
 i. [E] Certain entities cannot be naturally destroyed.

4.

- Fe— Nothing indivisible can be naturally destroyed.
 ri— Certain entities are indivisible.
 o— [E] Certain entities cannot be destroyed.

The two latter modes [Darii and Ferio] are indeed true modes, but in practice they are used only rarely [*ib.*, p. 386-7].

There are also other syllogisms which must be referred to the first class, such as:

- o An opaque star takes its light from the sun.
 The moon is an opaque star.
 E The moon takes its light from the sun.

Another form.

- No fixed star takes its light from the sun.
 Sirius is a fixed star.
 Sirius does not take its light from the sun [*ib.*,
 387].

In a true syllogism there cannot be more than three terms [*ib.*, 389].

The second form [of the syllogism first cited] has also four modes, which are signified by the words Cesare, Camestres, Festino, Barocco.

[Example

- | | | |
|-------|---|------------|
| Ce— | Nothing that has mobile parts is indivisible. | |
| | | Major |
| sa— | Every spirit is indivisible. | Minor |
| re. E | No spirit has mobile parts. | Conclusion |
-
- | | |
|----------|--------------------------------------|
| Ca— | Every spirit is self-conscious. |
| me— | Nothing divisible is self-conscious. |
| stres. E | Nothing divisible is a spirit. |
-
- | | |
|-------|--|
| Fe— | Nothing simple can be naturally destroyed. |
| sti— | A certain entity can be naturally destroyed. |
| no. E | A certain entity is not simple. |

- Ba— Every compound can be naturally destroyed.
 ro— A certain entity cannot be naturally destroyed.
 co. E A certain entity is not a compound (*ib.*, 390)].

Rule. When one and the same predicate cannot be affirmed of two subjects, but must be affirmed of the one, and denied of the other, then the one subject cannot be a containant of the other [*ib.*, 391].

SORITES. With the Greek Stoics this word meant a specious question; . . . but with the Schoolmen it signifies a series of consequences; and so later with Casaubon and Grotius.

Examples. A haughty man knows not his own internal misery.

Wherefore he knows not himself.

Therefore he is a fool [*ib.*, 398-401].

A sorites may consist of a number of consequences.

A sorites can be changed into one or more syllogisms.

ARISTOTLE.

Every single thing signifies Substance, or Quantity or Quality, or Relation, or Where, or When, or Situation, or Possession, or Action, or Passion. These are the ten categories (*De Catagoriis*, C. iv[I, 22B]).

MALEBRANCHE—*De Veritate*.

General ideas and the ideas of logic never beget anything but
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a vague, superficial and barren science. Therefore so far as possible, we must consider these distinct and special ideas of things* with attention; that so we may learn the properties which they include. It is in this way that nature must be investigated, dismissing all those chimeras which exist only in the brains of certain philosophers (L. III, C. viii [*ad fin.*]).

* Malebranche has been speaking of the "clear and distinct ideas of extension, figure and local motion" as contrasted with "the general and confused ideas" of the metaphysician and logician

DESCARTES.

I have often noticed that philosophers fell into the error of trying to explain by the definitions of logic things which were exceedingly simple and well known of themselves. Thus they made them obscure (*Prin. Philos.* [P. I] X).

Syllogisms are of various kinds: simple, compound, regular, complex, conjunctive; and of these there are modes.*

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PREDICATES, CATEGORIES, QUESTIONS.

ANDR. RYDELIUS.

The point of enquiry is: 1. Can anything be? 2. Does it exist? 3. What is it? 4. How great? 5. What is its quality? 6. Its efficient cause? 7. Its effect? 8. Its end? 9. The means? 10. Its condition? 11. Its material? 12. Its form? 13. Its mode? 14. Where is it? 15. When? 16. In what order? [*Förnufts Ofningars*, P. 4, Art. XI, p. 291].

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(To be Continued.)

* Probably quoted from Rydelius.

THE BRAIN.

BY EMANUEL SWEDENBORG.

Chapter VIII (*Continued*).

THE INTERNAL CAROTID AND VERTEBRAL ARTERIES.

378. 163. In transcribing the weighty observations of our authors on the subject of the blood of the cerebrum, I may perhaps seem to have been over-lengthy; but if only there were a hundred times more particulars ready to hand, my wish would be to fill still more pages with them; for they are so many truths and lights; and there are, as yet, no other signs and guides whereby the causes of things and the sciences can be drawn from darkness to the light.

379. 164. What significance is to be attached to the passage of the basilar sinuses, the receptacula of the lateral sinuses, and the jugular vein itself, through tracts that are subtly tremiscent, has been pointed out above.* Something of the same kind occurs in the case of the carotids as soon as they touch the cranium, and later when they enter it near the elevation of the posterior clinoid processes, and when they traverse the cavernous sinuses. For near the larynx they detach themselves from the external carotids, with which they have hitherto been united, and then, by an angular path, they wind through the cranium, under the dura mater, and ever cotremulous with the petrous bone, and especially with the Eustachian tube which also bends thitherwards. In some cases, moreover, a sesamoid bone gives them easy vibration.† There is also the fenestra, a continuation of the dura mater, which covers a blind and impervious foramen, and over which the carotids lie in their passage.‡ In the receptacles§ they are saluted by many nerves of the external

* In the induction contained in Ch. VII, which is lost.

† See n. 323.

§ The cavernous sinuses.

‡ See n. 327.

organs; and they are touched both directly and indirectly by intermediating membranous productions; to say nothing of the circumstance that, being crammed with much blood, they seem to be able to embrace all those nerves in a soft bosom, so that whatever of tremulation comes from the branches to the trunks of the above-mentioned nerves, is communicated to the neighboring arteries. Moreover, the sella Turcica is the very center of the base of the cranium, so that hither comes every vibration from the peripheries. Afterwards, when they mount into the cerebrum, they proximately receive every tremiscence existing in the cortical substance; that is, to say, the trunks, little sinuses, and branches receive the general tremiscence, and each tiny offshoot the particular.

380. In these circumstances, there surely lies concealed something well worthy of enquiry [to wit, the reason why these vibrations are received] namely, because the variously curved cavity of the carotids does not always pour its blood into the arteries of the cerebrum; but the blood sometimes makes a stay in this curved threshold, and then more or less of it is demanded therefrom. Now unless it were then continuously animated with a tremulous vibration, when there is no longer a perpetual collision of the parts arising from the action of the muscular tunic, the purer entities would easily be enmeshed in the grosser, and the volatile portion which the cerebrum demands from the blood, could not be duly disengaged. At any rate, there is a perpetual modification of the entities in the cerebrum, for herein consists sensual life adjoined to animal life. And, therefore, at the very threshold to the sphere of this activity, the blood whereby all that life is poured in, being induced into a similar state by means of the dura mater associated with it, and of the nerves applied to it, learns to live a life concordant with the cerebrum.

381. 165. Inasmuch as an abundance of experience is now at hand, in the citations that introduce the present chapter, the time has come to confirm those positions which have been roughly outlined here and there in the preceding pages, respecting the arteries, veins and sinuses of the cerebrum; the positions, namely:

I. That, in respect to the blood's transflux and circulation, as it is commonly called, all the vessels of the whole cerebrum, cerebellum, medulla oblongata and spinalis, are in no way ruled by the heart, but solely by the above-mentioned organs as their own proper motories.

II. That by means of the veins continued from their internal parts, the sphere of the activity of these bodies also extends itself outside the cranium and the vertebral sheath all the way to the superior cava, and the right auricle of the heart.

III. That by the force of the animation of the aforesaid bodies thus urging them, that is, by a relatively external force, all the vessels contained within the cranium and vertebral sheath, are opened and constricted; and this in such way, that when they are opened, they are everywhere drawn open laterally; and thus are made wider and are shortened in length; and so, vice versa when they are constricted. And that this effect coincides at moments reciprocal with the alternations of the expansion and constriction of the bodies themselves.

IV. That all the above-mentioned vessels are set in the stream of the animatory motion of the brains and medullas; and this in such way, that they can be stretched in respect to either dimension, and constricted in respect to either. Thus from these vessels mainly, we have the opportunity of searching into the rationale of the motion obtaining in the whole cerebrum, in each member thereof, in the part of this member, and in the part of the part.

V. That each drop of blood is common to all the vessels when the latter are set in their state of expansion; but that in their state of constriction they are particularly devoted to their own tracts, and most particularly to their own cortical and cineritious substances; that is to say, to those substances into which they insinuate the blood drawn from the common store. Or, what amounts to the same things, that in their state of expansion, all the vessels, wheresoever they be, are opened simultaneously, though in proportion to the size of each one; but, in their state of constriction there is no open passage from arteries to arteries of the same degree; nor from arteries to veins, nor from veins to sinuses; but passage is open, on the one side, only to the

cortex or ash, and on the other, to the receptacles of the lateral sinuses, or to the jugular veins.

VI. That into the vessels opened by an external force, the blood flows spontaneously.

VII. That when they animate, the purer substances of the cortex and ash, twist and untwist in the manner of a helix, and thus invite to themselves the purer essence of the blood, and express the same into the fibres.

VIII. That the brain commands and draws to itself such quantity and quality of blood and essence as its animal and sensual life requires.

IX. That the animation of the cerebrum most exactly coincides with the animation of the lungs; but not with the moments of the pulsation of the arteries of the heart. It is different, however, in the embryo.*

X. That in respect to its perpetuation, the motion of the heart is dependent on the two brains and the two medullas; but the two brains and the two medullas are not dependent on the heart, except as regards the fact that by this path they are able to draw to themselves that part of the blood, in respect to quantity and quality, which is demanded by the change and condition of their states.

382. 166. I. *That in respect to the transflux of the blood, all the vessels of the whole cerebrum, cerebellum, medulla oblongata and spinalis are in no way ruled by the heart, but solely by the above-mentioned organs as their own proper motories.* This is clearly apparent not only from those arteries and veins that graze the surface, but also from those that enter into the interiors. The cranium is a delimiting barrier between the arteries of the heart and those of the cerebrum. Hence when the carotid trunk comes to this barrier it abandons the main stem and is divided into an internal and an external. The internal, in order to entirely remove itself from the sphere and activity of the heart which extends all the way to this barrier, puts off its muscular and other tunics, and puts on tunics wholly different, to wit, a membranous tunic borrowed from the dura mater, and a filamentary or reticular tunic borrowed from the inter-

* In the MS., the last sentence is a marginal note.

costal nerve; it retains, however, its own inmost tunic. For unless the arteries of the heart are surrounded by an accompanying muscular tunic and by a nervous tunic taken mainly from the par vagum, the sphere of the heart's activity would seem desirous to come to an end. The carotid changes not only its tunic but also its nerve; and it takes to itself that nerve which, outside the cranium and the vertebral sheath, is entirely devoted to the offices of the medulla spinalis, and consequently of both the brains; for which reason it may be called the vicar of the medulla spinalis. But even so, the carotid does not entirely escape the internal government of the heart; and therefore to the end that it may deliver itself, it mounts up into a bony foramen and therein marvellously bends and twists; and this transversely and at an angle almost perpendicular to its former direction. On this account the blood that has been impelled to this point by an external force beating upon the walls, does not go any further, unless that which is within the cranium, and finally that which runs through the cerebrum, successively gives it opportunity and place. WEPFER has confirmed this by experience. When he forced a yellow liquor into the carotid before its division, not a drop of the liquor appeared in the cerebrum, but only in the dura mater,—having passed up, at the time of the injection, into the external carotid [n. 344]. And that it may still more surely remove itself from the vibrations of the heart, the artery, when it enters the cranium, makes many twists; for it ascends and descends near the posterior clinoid processes; and then again ascends, sometimes pushing through a bony oval foramen* in the bone, and again through the dura mater under which it is still held for a short time. Moreover, while still in the receptacles, it is under the bonds of the intercostal nerve; for bands are there injected by the sixth and fifth pairs, from which the intercostal is thought to take its origin. Therefore the vibration of the heart does not extend itself to this point, either by force of a continuous action, or by an

* Emerging from the cavernous sinuses, the carotid usually passes through the carotid groove at the inner side of the anterior clinoid process. Sometimes, however, by

a growth of bone or cartilage, the groove becomes an oval foramen, the carotico-clinoid. See Wepfer, n. 343 above.

auxiliary muscular tunic; and thus whatever of this force is not lost in the first threshold, will certainly be lost in the second, third or fourth curved step or angle; and at any rate in the cavernous receptacles, where the artery appears to be more bellied.

383. In animals, this artery proceeds with fewer repeated twists; it is entirely split up into little branches and sanguineous filaments, which are accompanied by tendinous threads or nerves; and, before mounting over the lobes of the cerebrum, these little branches, or the divided carotids, again coalesce into a trunk. The reason seems to be, that each least drop of blood in this artery, flowing in its little branch which is accompanied by a membranous or nervous production, shall remove itself from the government of the heart, and shall not return to the trunk until it has been so removed; to the end that it may then be able to resume its progress under an entirely new motory. For the cranium of animals is too thin, and the path of the artery too short to permit of the blood winding in the same flexures [as in men]; and yet the cerebrum, which in animals more than with man lives conjointly and concordantly with the cerebellum, is hotly demanding it. Thus, up to this point, the intercostal nerve holds the carotid in bonds; and then, it delivers it over to the cerebrum unfettered and free, under whose government alone it will thenceforth continue its path.

384. When at last the artery is presented to the cerebrum, it is set in the furrows, fissures and ridges, between the lobes, the serpentine peaks and all the lesser divisions and windings; and on both sides these plainly act upon it in this intermediate stage, whether it be entire or ramified. Hence the infinitude of off-shoots which enter into the cortical and cineritious substances, and are inserted therein particularly, must needs undergo all those alternations which the substances themselves undergo when in animation; that is to say, they must needs expand and constrict; the effect of which, as coming from causes, goes back to the larger shoots, and from these to the trunks, and from the trunks to the cavity that runs through the cranium. Here it is terminated, as in its limit on the one side of the cerebrum; while on the other side, is terminated the sphere of the activity of the

heart. But there is this difference, that the cerebrum acts from an infinitude of little hearts, or from individual parts or cortical and cineritious substances, as from efficient causes, upon compounds; that is to say, its action proceeds from tiniest branches to trunks; but the action of the unique and great heart of the body proceeds from trunks by degrees to offshoot branches.

385. The nature of the action of each lobe upon its intercepted artery, and of each serpentine ridge and fissure upon its intercepted branchlet, will be abundantly evident merely on reflection as to the nature of the expansion and constriction of all the parts. The case with their action is similar as with the action of the hemispheres of the whole cerebrum,—which likewise is intersected by a great fissure,—upon the sinuses, and especially upon the sinus of the falx. In order, therefore, that the arterioles, that is to say, the whole artery and its branches, may be dependent solely on the principal substance, they are woven into the pia mater, only in the sense that, while lying upon it, they are united to it by offshoots which they send off.

386. A like condition obtains in the case of the vertebral artery, during its progress to the superior vertebrae of the neck, and afterwards to the cranium, and also when it emerges within the cranium under the dura mater; for almost in the same way it bends back and forth two or three times, that is, has some remarkable twists even at right angles. Very similar also is the condition of this artery when it more particularly enters the bony sheath of the medulla spinalis; for it there insinuates itself through the same fissures whereby the nerves* are sent out; and by these nerves it is reduced from obedience to the heart to obedience to the medulla, as will be shown below; and the same also is done with the trunk in the great foramen of the occiput by the last pair of the nerves of the head.†

387. This is the reason why the anterior and posterior spinal arteries originate within the cranium from the vertebral artery when, after the inflections mentioned above, it has passed through the foramen. Moreover the vertebral artery insinuates itself into the posterior part of the cerebrum and the anterior part of the cerebellum, and into their cortex and ash, and also

* The spinal or cervical nerves.

† See n. 352, note.

into that of the medulla oblongata and its beginnings; and from these parts results an exactly similar effect from simples to compounds, as was noted above in the case of the carotid.

388. When this artery has mounted over the olivary and pyramidal bodies, it runs along the middle of the annular protuberance in a little canal, where it suffers itself to be entirely acted upon by the cerebrum and cerebellum. For the confirmation of this statement a description of the protuberance itself must here be premised; and it will not then be necessary to pass on to other particulars, since the same reasoning obtains in all [parts of this artery within the cranium].

(To be Continued.)





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